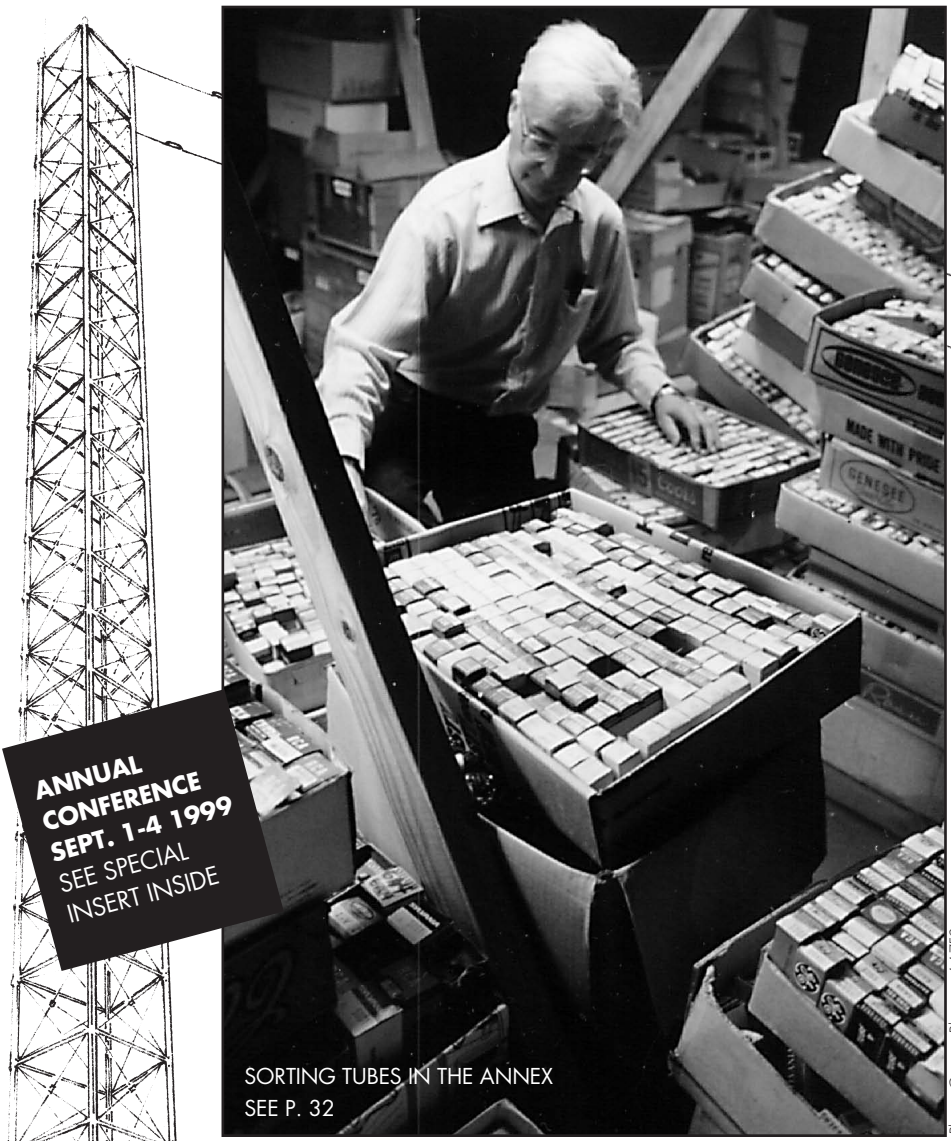
THE OTB

THE OLD TIMER'S BULLETIN AUGUST 1999 VOL. 40 / #3

OFFICIAL JOURNAL OF THE ANTIQUE WIRELESS ASSOCIATION, INC.

Published for the collector, historian and old-time radio operator



ANNUAL CONFERENCE SEPT. 1-4 1999
SEE SPECIAL INSERT INSIDE

SORTING TUBES IN THE ANNEX
SEE P. 32

Photo: George Plafteter, AA2FO

THE OLD TIMER'S BULLETIN

OFFICIAL JOURNAL, ANTIQUE WIRELESS ASSOCIATION, INC.
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The Vacuum Tube
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ANTIQUE WIRELESS ASSOCIATION, INC.
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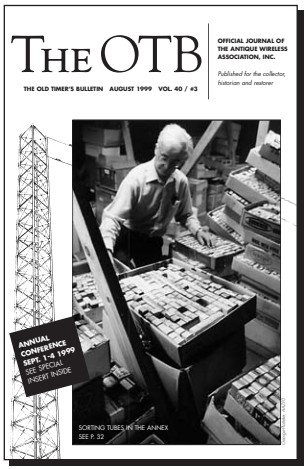
FROM THE EDITOR

Introducing our new cover!

Unless you are in the habit of diving directly into each new *OTB* with scarcely a glance at the outside, you probably were (pleasantly I hope) surprised and startled at our new look! We've felt for some time that the name and cover design needed a more modern interpretation—something that would appeal both to our current members and to the newcomers we hope will contribute to the life and vitality of this organization in years to come.

As you can see, we are now *The OTB* (which is how most people refer to us anyway) instead of "The Old Timer's Bulletin"— a perhaps not-too-subtle change intended to welcome newcomers for whom the original wording might not be too appropriate. The original (and charming) "American Primitive style" towers are also gone from the cover—replaced by a new tower whose provenance is no less rooted in radio history. Its design is based on a 1925 illustration of Zenith broadcasting station WJAZ found in Alan Douglas' indispensable *Radio Manufacturers of the 1920s* (look at Volume 3, p. 254 if you have a set).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The AWA board previewed the new cover with enthusiasm at the last meeting but, later, one member contacted me and asked if there wasn't some way we could incorporate the old towers in the new design. I won't tell you who he is, but by a strange coincidence he happens to be featured on the current cover. I had to turn him down on that, but I did agree that it would be nice if we could somehow hang on to the familiar icon so long associated with this publication. Look for it on the top of our masthead page (inside front cover), where it is associated with the memorial to Bruce Kelley, our founding editor.

I know we definitely won't be able to please everybody, but I do hope that most of our members will find this to be a constructive and positive change. By the way, we do have another version of the cover, with the tower reduced to thumbnail size, that will be used when we need to run a full-width square-format illustration (as most were in the past)

Feature articles in this issue

In addition to the usual broad array of topics offered by our columnists, this issue brings you several interesting feature articles. Wireless historian Jim Rybak is back with another in his *Forgotten Pioneers of Wireless* series. Did you know that Karl Ferdinand Braun shared the 1909 Nobel Prize in Physics for achievements in wireless telegraphy with Guglielmo Marconi? Thought not.

You'll also find a fascinating account written by Bob Morris, an early and very influential member of AWA and now a Silent key, of his government service during World War II. In *Establishment of the Radio Monitoring Station at Vint Hill Farms*, Bob tells how he applied his expertise as an NBC executive to the problem of developing radio monitoring facilities for The Signal Corps during World War II.

Our tireless meet reporter Larry Babcock returns to these pages with reports on no less than *three* events (see *Meet Report Extravaganza*). Also in this issue (see *Headset Roundup*) we share with you the info sent in by members to supplement Dick Mackiewicz's famous headset list (see *From the Editor* and *Master Headset Finder* in the February, 1999 issue). We will continue to archive member headset data as long as it continues to come in, issuing additional updates from time to time.

Our "On the Internet" editor and resident Philco specialist Chuck Schwark has provided a page of Philco graphics (*Philco Images: 1920-1954*) to start you thinking about the theme of our upcoming Rochester conference—and you will find your conference advance information the special yellow insert in the middle of the

The President's Message

By the time you read this the Annual Conference in upstate New York will be just a few short weeks down the road. I urge all of you to get your reservations in early, as the headquarters hotel, the Rochester Marriott Thruway, will most likely be sold out. Fortunately there are other hotels in the area, so don't despair if you are informed that the rooms are gone. (Note: See AWA News, p. 9 for some suggested laternate accomodations.) Again it promises to be a wonderful week, starting very early on Wednesday morning and continuing through Saturday afternoon.

The staff of energetic and very hard-working volunteers have put together a great program of technical papers of wide interest, along with general entertainment, two large auctions, banquets, visits to the Museum, contests, and so forth. And of course, the old-radio flea market which seems to go on forever. We promise you will not be bored.

If you know someone who has never been to the conference, talk to them now and try to get them to attend. Emphasize what a great time we all have, and how people from all over the world attend, year after year. While this is definitely a member-only meeting, the registration desk is prepared to sign up new members, as they do every year. And if you have never been to the AWA Museum to see the world-famous collections, take advantage of the opportunity to go. A shuttle bus will be available for transportation.

We hope to have the AWA Review, Volume 12 for sale. This is the largest Review we have ever published, with over 300 pages. Subject: The Atwater Kent Radios, by Ralph Williams. It is the complete story of Atwater Kent's radios, the remarkable man behind them, and how he manufactured and sold over 5 million sets in the span of less than fifteen years. All-in-all, it promises to be a great meeting. See you there!

Bill Fizette, W2DGB

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magazine. Finally, Ed Gable, our museum curator, has put together an album of images we call *Behind the Scenes at the Museum Annex*. Ed really had these photos done as part of an expansion of the museum's presence on our new AWA web site (www.antiquewireless.org)—but we decided to include a print version of the album in this issue so that *all* members could see it, not just the ones who have on-line capability.

The new AWA Web site

And speaking of the new AWA web site, if you have an internet connection and haven't yet visited www.antiquewireless.org, do it now! For a long time, information about the AWA reached the net only through the our museum's web page. That's because the forward-looking museum folks were the first AWA group to establish a web presence (using guest space provided on another organization's site). However, AWA now has its own dedicated site—where the museum, the *OTB*, and other AWA groups and activities will share space.

The *OTB On Line Edition* has moved to the new site, and so has the museum. The museum's web offering is being reevaluated and expanded, so you will want to keep an especially close eye on their pages! The new site has a very attractive "front door" designed by Chuck Schwark, who also works with me to put together *"OTB On Line"* and is lending his expertise to the design of the new museum presence.

We invite your comments!

ON THE COVER

Mike Csontos sorts through some of the 50,000 tubes in stock at the Annex. One they are organized and properly inventoried, AWA plans to supply tubes below market value to members needing them for specific restoration projects.

For more about activities at the Annex, see p. 32.

AWA News

***OTB* POLICY ON PROMOTING EVENTS:** The *OTB* is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Do not send your information directly to the *OTB* Editor. Please send it to Joyce Peckham, Box E, Breesport, NY 14816. Closing date is six weeks prior to first day of month of issue.

Calendar of AWA Activities

AUGUST 8
Joint Meet with NFWA—Amherst, NY

SEPTEMBER 1-4
Annual Conference, "Philco"

DECEMBER 4-5
Bruce Kelley Memorial 1929 QSO Party

DECEMBER 11-12
Bruce Kelley Memorial 1929 QSO Party

NOVEMBER 7
Annual Business Meeting
(See below for detailed information on meets)

Calendar of Meets

(AWA logo identifies AWA-sponsored events)

California Historical Radio Society

FOR DATES, SEE BELOW

Meets are held at various locations throughout the state. August 7, TBA; September 4, Fairfield; October 2, Pismo Beach; November 6, TBA. For more info, check the CHRS hotline (415-821-9800).

ARCI Radiofest XVIII

AUGUST 4-7

Presented by Antique Radio Club of Illinois at Elgin Plaza Hotel, Elgin, IL. Huge flea market, old equipment contest, auctions, awards banquet and show, presentations, operating vintage ham station, big Zenith display, free admission to Muchow museum. For info about the equipment contest only, contact Chuck Schwark at caschwark@aol.com. For Radiofest XVIII reservations and general information contact ARCI, P.O. Box 1139, LaGrange Park, IL 60526 or e-mail us at: arci31280@aol.com

Niagara Frontier Wireless Association

AUGUST 14

Joint meet with the AWA and our largest of the year. At the Amherst Museum, Amherst, NY. From the NY State Thruway, take Exit 49 (Transit Rd., Rt. 78) north nine miles. Left on Tonawonda Creek Rd. Proceed two miles to the museum. Flea market 8 a.m. to noon. Museum opens 10:30 ($2 entry), and has a full room of early radios and TVs. Auction of more items from the John Myers estate begins about 11 a.m. No reserve. Also donation auction. There will be a talk related to early radio at about 12:30. Contest categories: whatever you want to bring! Entry fee $5.00, which includes an annual NFWA membership. No additional fees to sell or for any other activity. For info, call Larry Babcock at (716) 741-3082 or Gary Parzy at (716) 668-2943.

Recurring Meetings

• **California Historical Radio Society** — Meets third Wednesday of each month at ITT Technical Institute, 4750 Wesley Ave., Norwood (Cincinnati), Ohio. For more information, contact Greg Tierney (513) 732-1844.

• **CARS, the Cincinnati Antique Radio Society** — Meets on the third Wednesday of each month at ITT Technical Institute, 4750 Wesley Ave., Norwood (Cinti.) Ohio. For more information contact Greg Tierney, (513) 732-1844, or Bob Sands, (513) 858-1755.

• **Carolinas Chapter of the AWA** — Meets approximately bimonthly. For more information, Contact Ron Lawrence, President, P.O. Box 3015, Matthews, NC 28106-3015; phone (704) 289-1166.

• **Central Ohio Antique Radio Assn.** — Meets at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (I-70 Exit 103B). Contact: Barry Gould (614) 777-8534.

• **Delaware Valley Historic Radio Club** — Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Teford Community Center on Hamlin Ave. in Telford, PA. Annual dues: $15.00, which includes a sub-

scription to the club's monthly newsletter "The Oscillator." For more info contact Bill Overbeck at (610) 789-8199 or Dave Snellman at (215) 345-4248. Club mailing address: P.O. Box 847, Havertown, PA 19053.

• **Houston Vintage Radio Association** — Meets second Tuesday each month (except Jan. and Dec.) at Lai Lai Restaurant, Tides II Motel, Houston Medical Center, Main and Holcombe Sts., Houston, TX. Meetings include auction/program, 7-10 p.m. Assoc. publishes *Grid Leak* quarterly, monthly activity announcements. Membership $15/yr. Write: HVRA, P.O. Box 31276, Houston, TX 77231-1276, or call Richard Collins, (713) 778-0721.

• **Hudson Valley Antique Radio & Phono Society** — Meets third Thursday of month, 7 p.m. Meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

• **London Vintage Radio Club** — This Ontario, Canada club meets in London on the last Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3IIA, RR#2, Alma, Ontario, Canada. (519) 638-2827.

• **Mid-Atlantic Radio Club —** Meets monthly, usually the third Sunday of the month at the New Hope Seventh Day Adventist Church, Bur-

Curator Gable is Atlantic Division Ham of the Year!

Congratulations to Ed Gable, Curator of the AWA Electronic Communication Museum, who is the winner of this year's ARRL Atlantic Division "Amateur of the Year" award! Quoting from an Atlantic Division press release;

"Ed Gable, K2MP, is from Hilton, NY. He is an active member of the Rochester DX Association and currently serves the club as secretary-treasurer. He has also volunteered for the Rochester Amateur Radio Association. Ed is known for giving outstanding programs at radio club meetings. He holds an Assistant Section Manager appointment in Western NY Section, in addition to an appointment as an Assistant Director in the Atlantic Division.

After radio historian Bruce Kelley W2ICE became a Silent Key, Ed Gable K2MP became curator of the Antique Wireless Association museum. This major collection of information and artifacts is an important resource on American history and has particular significance for hams, because so much of the early work in wireless was done by experimenters who were hams.

At the same time as we look forward towards a new century and a bright future for Amateur Radio, it is essential to remember where we came from and honor those who went before us. Ed's work with AWA helps us keep that perspective.

The Amateur of the Year Award is as much about character and care for others as it is about activities. The ham who nominated Ed for the award related the following anecdote that illustrates the character of the man: "I recall one year at the Syracuse Hamfest when, in passing, I told Ed that I had just seen a Hallicrafters S-41G just like the one that I had for my first receiver. A number of years went by. At the Buffalo Hamfest, Ed took me to his car and said, 'Here, this is for you." There it was — an original S-41G in full operating condition!"

Ed Gable, K2MP (left) at the awards dinner with the two other Atlantic Division honorees: Angelo DeFazio, W2SRP, (center) the 1999 "Grand Ole Ham" and Paul Shuch, K6TX, 1999 Technical Achievement Award. (Photo from Atlantic Division web site).

• Tube Collector's Group Formed — The new Tube Collector's Association is now in operation. This is an organization of collectors and history enthusiasts focusing on all phases and vintages of tube design. The founding president of the group is Al Jones, W1ITX, who is known for his award-winning tube collection. For more details and complimentary copies of the association's bulletin, contact Al at (707) 464-6470, Ludwell Sibley at (541) 855-5207, or mail to P.O. Box 1181, Medford, OR.

tonsville, MD. Contacts: President, Ed Lyon, 11301 Woodland Way, Myersville, MD 21773-9133, (301) 293-1773, e-mail lyon@fred.net or Membership Chair, Barry Zimmerman, (301) 696-5561, e-mail: barryradio@aol.com.

• **New Jersey Antique Radio Club** — Meets second Friday each month, 7:30 p.m. Holds three annual swap meets. Contact (send SASE) Phil Vourtsis, 13 Cornell Pl., Manalapan, NJ 07726, (732) 446-2427.

• **Northwest Vintage Radio Society** — Meets second Saturday of each month (except July and August), at or about 10 a.m., at the Buena Vista Club House at 16th and Jackson streets in Oregon City, Oregon. Members display radios, exchange information. Guests welcome at all meetings and functions, except board meetings. For info, write the Society at P.O. Box 82379, Portland, Oregon 97282-0379.

• **Oklahoma Vintage Radio Collectors** — Meets second Saturday each month, Spencer's Barbecue Restaurant, N.W. 63rd and May Avenue, Oklahoma City. Dinner/socializing, 6 p.m.; meeting at 7 p.m. Membership, $12/yr., includes monthly *Broadcast News*. Info: SASE to OKVRC, P.O. Box 72-1197, Oklahoma City, OK 73172-1197, or call (405) 722-0595 or (405) 755-4139 eves.

• **Ottawa Vintage Radio Club** — Meets monthly (except June and July) in Conference Room, Ottawa Citizen, 1101 Baxter Rd., Ottawa, Ontario. Contact: Tom Devey, 601-810 Edgeworth Ave., Ottawa, ON K2B 5L5, (613) 828-5152. Membership: $10 Canadian/yr.

• **Society for Preservation of Antique Radio Knowledge** — Meets at 7:30 p.m., fourth Tuesday of each month in the party room at Cassano's Pizza Parlor, 1700 East Stroop Rd., Kettering, OH. Membership, $12/year. Write P.O. Box 482, Dayton, OH 45449; e-mail sparkinc@juno.com; or call Dan Gebhart (937) 299-9570.

• **Texas Antique Radio Club** — New club forming in San Antonio area. Meeting dates to be announced. Contact: Joe Koester, President TARC, 7111 Misty Brook, San Antonio, TX 78250-3498. (210) 522-1662.

Service Sources Available

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector. Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA Slide/Video Program

The Antique Wireless Association has available several historical documentaries to loan to affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Richard Ransley, P.O. Box 41, Sodus,

AWA Nets

PHONE:

SUNDAY:
7247 kHz, SSB, noon (NCS:N4FS); 3837 kHz, AM 4 p.m. (E.S.T.), 4:30 p.m. (during E.D.S.T.) (NCSs:W2ZM & W2AN)

TUESDAY:
14274 kHz SSB, 2:30 p.m. (NCSs KC3YE and W0FXY) 3837 kHz SSB, 8 p.m. (NCS N4FS)

MONDAY-WEDNESDAY-FRIDAY:
3867 kHz, 9:30 a.m. (NCS: W2SHN)

CW:

DAILY, 4 p.m., 3588 or 7050 kHz. Protocol informal. Check both frequencies for activity and join in, or call AWA de (your call) and see what you stir up.
First **WEDNESDAY** of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester Area)
MONDAY, 7:30 p.m. (NCS: W2ICE)
Receive 146.820 MHz;
Transmit 146.220 MHZ

Conference Accomodation Alternatives

Information on registering at the Conference Hotel (the Thruway Marriott) will be found in the special yellow conference insert in this issue. Other convenient locations are Day's Inn (716) 334-9300; Red Roof Inn (716) 359-1100; Microtel (716) 334-3400; Highlander Inn (716) 334-4280; Super 8 Motel (716) 359-1630 and Dorkat Motel (716) 334-7000.

There are no camp sites conveniently close to the conference location, but those interested in camping might want to consider the Canandaigua/ Rochester KOA. Toll-free reservations: 1-800-KOA-0533; information: (716) 398-3582.

NY 14551. The following are available:

VHS VIDEO PROGRAMS

V-2 — "Electrons on Parade." 18 min. 1938 movie made at RCA's Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — "The British Receiver." Documentary of the AWA/BVPS meet with visit to Marconi's Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

V-5 — "The Early Years." Historical documentary narrated by Clarence Tuska telling of the early years of amateur radio, founding of the ARRL and WW I military radio training school. (VHS program transferred from slides.)

V-6 — "The Key." History of the telegraph/radio key covering early hand keys, semi-automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

V-9 — "The Transatlantic Tests and 1BCG." Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

V-12 — "Those Wonderful Magazine Covers." The story of radio through magazine covers. Colorful with period music.

V-15 — "The WHAM Story." Details development of a pioneer radio station in Rochester, NY. Program developed with assistance and recollections of Art Kelly, the station's former general manager.

V-16 — "The Charles Herrold Story." Video prepared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting's Forgotten Father who started broadcasting in 1912.

SLIDE PROGRAMS

S-1 — "Portrait of a Pioneer." The life of Elmo Pickerill.

S-2 — "Polar Adventure." Pictures taken by Bud Waite and his narration describing numerous trips to the Antarctic over a 35-year period.

S-3 — "70 Years of Vacuum Tubes." Describes the history of vacuum tubes.

S-4 — "The Early Years." (See description for V-5.)

S-7 — "The Transatlantic Tests and 1BCG." (See description for V-9.)

S-8 — "Trip Through the AWA Museum" Covers exhibits and equipment.

S-12—"The Key." (See description for V-6.)

Silent Keys

We record the passing of the following AWA members with deep regret.

ALEXANDER H. KOSINSKI, N2SHG (3-31-99)

FRANK KRANTZ

RONALD G. MARTIN, W6ZF (3-16-99)

CARL B. SIVERTSON

FRANCIS WALTER SLOAT, 93, (1-23-99)

VERN AUBERT WEISS, 82, WB9MPP (4-10-99)

Note: AWA officers and members are requested to submit all information about Silent Keys, with or without special recognition, to Joyce Peckham, Secretary, Box E, Breesport, NY 14816. This will help in the collection, coordination and appropriate recognition of both AWA members and others who have made contributions to the electronics and entertainment industries.

LETTERS TO THE EDITOR

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the OTB *staff or the Antique Wireless Association.*

EDITOR'S APOLOGY TOO BROAD

Your Editor's Apology for drawing beam power tubes "pentode style" (see *A 1938 TPTG Rig in Modern Dress*) in the last issue is unnecessary if the tube of choice is a 42 or 6F6. These tubes actually *are* pentodes. The 42 was released in 1932, four years before the first beam tube (6V6) was first marketed. The 6F6, which was an octal-based 42, was first issued in 1935.

KEN OWENS
Circleville, OH

PRESERVING RADIO VERIFICATIONS

The Committee to Preserve Radio Verification is an official committee of North American Radio Clubs (ANARC)—which was founded in 1964 as a unifying organization for radio listening clubs in the U.S. and Canada. It is a five-person group whose goal is to preserve QSLs belonging to hobbyists who are no longer active. The CPRV collection is part of the Broadcast Pioneers Library of American Broadcasting located at the University of Maryland. This library, devoted exclusively to the history of broadcasting, also contains a wide range of other materials, including recordings, books pamphlets, periodicals, photographs, and scripts.

The current collection includes many thousands of QSLs, principally from shortwave and medium-wave broadcast stations. There is a computerized index, with all QSLs fully identified with their original owner. If you are interested in donating a collection for preservation by this organization, contact me. CPRV also has a "registered collections" program for those who wish to donate at a later date. Stickers are provided to be pasted into the QSL albums identifying CPRV as the eventual recipient.

JERRY BERG, CHAIRMAN CPRV
38 Eastern Ave.
Lexington, MA 0241
Phone (781) 861-8481

TESLA "CENSORSHIP"?

Mr. Bradford's articles on Tesla's Wireless system *(February and May 1999 issues)* seem to miss the whole point of what Tesla was doing. He was not mainly interested in the transmission of signals but in the transmission of power. During his experiments in Colorado, 200 fifty-watt bulbs were lit to full brilliance in a house 26 miles from the transmitter.

The results, when they became known, were not popular with the financial interests that had invested in electric power systems. Free, or almost free, power is still a subject in which there is much censorship and misdirection.

Another omission from the *OTB* has been any mention of earth batteries that were used to power telegraph and telephone systems and even small factories. After more than 100 years, censorship is still in operation.

On another topic, would you have any interest in an article on the strange history of electrical instruments used to measure galvanic skin resistance? Or perhaps this is another forbidden subject.

M. TWOSE
Toronto, Ont.
Canada

While the thrust and intent of Henry Bradford's articles was certainly a discussion of Tesla's wireless work, Mr. Bradford also offered appropriate background material on the inventor's interest in power transmission.

Commenting on the "muzzling" of Tesla's electrical power transmission scheme by financial interests is out of this editor's area of expertise. However, in an age when homeowners sometimes hire environmental firms to check for the possibility of dangerous electromagnetic radiation being emitted from nearby power lines, one can't help wondering what the current popularity would be of a scheme that could transmit 10,000 watts of power 26 miles through the air!

There are no forbidden subjects at the OTB. *Articles on any aspect of electrical or electronic history are welcome as long as they are solidly*

researched and well presented. It also helps if they are well illustrated. In fact, just the other day I was wishing somebody would send me a good article on quack electrical medical devices. Any takers?—MFE

GROUNDING THE "F+"

Dick Parks continues to receive thoughtful mail from readers of "Breadboarding." Here is some of the correspondence resulting from an issue that was raised in the May column.

I believe I can explain why, as you state in your column, "all the classic tube circuits showed the 'F+' tube connection returned to ground."

1. Returning the *F-* tube connection to ground places the filament negative voltage (effectively a reverse bias voltage) in series with the filament-grid r.f. diode. This reverse bias naturally desensitizes the r.f. rectified signal. Thus the reduction in volume.

2. Note also that the filament resistance (at least part of it) forms part of the load of the filament-grid r.f. diode, and that this is in series with (shared with) the *output* load circuit. This is essentially a negative feedback circuit and thus further reduces volume.

3. Because of the negative feedback of the output signal to the r.f. detection circuit (being in series with the r.f. detection circuit—*not* a negative feedback to the detected envelope), it is possible (I'm not certain of this) that this is the cause of the distortion. However, the d.c. reverse bias of the negatively charged filament probably causes r.f. clipping and this is almost surely a cause of distortion—at least in grid-leak detector circuits.

4. Note that if the F- filament is grounded, the output signal will be "bucked" by the negatively-charged filament, and thus at least part of the output signal will be conducted through the filament battery to the positively-charged filament. Thus the filament battery is in series with the output signal but connected in a reverse direction to at least part of the output signal and part of the output d.c. supply. This is probably destructive to the filament battery over time.

Vernon L. Chappell
San Diego, CA

Thanks for your letter on my detectors column! Your explanation on filament connections makes perfect sense to me. I don't have any trouble thinking of the grid-filament diode for explaining how a grid leak works, but then I seem to forget about it again!

Terman talks about "where detection takes place"—meaning at the grid-filament or at the plate-cathode, as in a power detector. Either way, you get the tube gain but, as you say, distortion will be different. The loading of the tuned circuit by the filament-grid diode will also reduce the selectivity some.

As to the life of the filament battery being possibly degraded by being in series opposing with the output signal, I bet it would be darn hard to measure that unless he used a mighty small battery.

Even though this column was supposed to appeal to newcomers to the hobby, I get a lot of letters (and ideas) from old-timers such as yourself. Sure has been interesting! —RP

…What piqued my interest in your breadboard article was the comment about grounding F+ or F-. I fussed over this distinction during restoring and building up two or three AK breadboards; the early 3-tube islands had the grid leak connected to A-; the later ones for 0.25 amp tubes put the grid leak to A+. I ended up looking at Terman's discussion of grid leak detectors in his 1932 book and discovered that connection of grid leak to A- probably results in an operating point that is at a more negative bias voltage up in the less linear portion of grid current vs bias (more detection) compared to connection to A+, which puts operation higher on the curve.

Without taking more time, I will leave it at that, but found his treatment gave an additional insight that I hadn't seen elsewhere. He mentions that grid leak connection to A+ is the usual configuration. You can wade through the parameters that Terman discusses but then you have to have a particular tube in mind. Coated filament tubes and tungsten filament tubes behave differently: coated filaments tubes being more sensitive.

Dan Merz
via e-mail

VINTAGE VIDEO NEWS

A press release recently received from radio historian, writer and collector Enrico Tedeschi announced his plan to start "Vintage Videonews," a daily vintage electronics broadcast over the internet. According to the release, the Monday-thru-Friday transmissions begin at 6:05 p.m. UK time and last for ten minutes. A live 2-way video chat is scheduled after each broadcast. If you don't

(continued on page 15)

BY LARRY BABCOCK

MEET REPORT EXTRAVAGANZA!

About the middle of last August, as he usually does, Larry Babcock sent me a report on the Niagara Frontier Wireless Association (NFWA) meet near Buffalo, NY. I usually print this one, replete with pictures of items on sunny flea market tables, in our November issue as a kind of antidote for cabin fever and other forms of the mid-winter blahs. However, this time Larry asked me to hold his report for the current issue as publicity for the 1999 meet, which will take place on August 14 (see AWA News column). I duly held back the report.

The scene now shifts to last April, When Larry sent me his usual report on the Bradenton, FL meet. This should have appeared in the May issue, but somehow it fell in a crack. Now things become a little more complicated because a month later this indefatigable meet attender and reporter unexpectedly sent me a report on the AWA Bloomfield, NY Spring meet (which is held in conjunction with our semi-annual board meeting).

This leaves me with a very large inventory of Babcock meet reports, which I need to get cracking and clear out before (as I fully expect) I receive Larry's run-down on our major Rochester meet (September 1-4)! Hence, the OTB *is now pleased to present the following meet report extravaganza!*

The NFWA Meet

The Niagara Frontier Wireless Association (NFWA) held another very successful antique radio meet on August 8, 1998 at the Amherst Museum just North of Buffalo, NY. About 200 people attended. The day-long event included the usual antique radio flea market as well as a contest, presentation, lunch and another auction of objects from the estate of John Myers. This is a joint meet with The AWA.

One difference with this meet is you don't have to get up in the middle of the night! The action starts when the museum gate is opened at 8:00 AM. The entry fee is only $3.00, which included coffee and donuts (donations were accepted). There was no additional fee for selling. The event took place right on the museum's grounds along a road of historical old buildings in a park-like atmosphere with a lawn and trees. There was no thruway or other traffic noise nearby as with so many other meets.

The NFWA August meet has a quiet park-like atmosphere. That's Ed Gable, curator of the AWA museum, in the center.

This year we sold more than ever before at any meet! Other sellers also reported brisk sales. Though this is largely a local meet, there were also collectors from Massachusetts, PA, Ohio and many from Canada.

The John Myers auction was major highlight of the event. John was an active collector and member of the NFWA, serving one term as president. His extensive collection filled two house base-

ments, a two-story garage, and a two-story two-car horse barn. Consoles were stacked on top of consoles to fit in the buildings. The NFWA has been hauling several trailer loads every year for the past four to various radio club auctions.

John's interests were wide, with everything from early Erla kits and other 20s battery sets to consoles and even many transistor radios NIB. The bidding was intense on these later items. There were several home brew crystal sets. Some included early factory detectors. There was an unusual Magnavox console speaker on long legs. It included a heavy amplifier with type 50 tubes and brought well over $200. This auction lasted over an hour and a half. About 100 lots were sold. There was no minimum bid on anything—everything was sold.

Checking out some of the items to be sold at NFWA's John Myers auction.

John's collection is about gone but there will still be another load available for our meet next year. It may be the last.

This year the museum opened an hour earlier, at 11:30 AM, so wives were able to view the exhibits while their spouses attended the flea market outdoors. Since this is the 50th anniversary for television in the Buffalo area the speaker at the event was a local radio broadcast pioneer, John Zach, who gave an interesting talk on the history of Buffalo radio and television. The NFWA also displayed, for a year, a collection of early TV objects in the museum's Hall of Communication. The museum emphasizes technology and many local aircraft company artifacts are displayed here as well as a large room full of radio-related artifacts.

This meet is the major activity of the NFWA. It has grown over the years and the support of AWA has been a definite benefit. I hope you will be able to attend the next one!

That's my wife Dot, in the center, at our seller's table at in Bradenton.

Bradenton '99

My wife, Dot, and I always try to make the Buffalo winter seem a bit shorter by spending the month of March in Florida. Our hope is that when we return home around April first the weather will be much improved. Unfortunately this is not always the case but this year it worked pretty well.

This meet was held on March 13. When we arrived at 7 a.m., the door was still locked, but by 7:15 things were in full swing. The flea market continued until almost noon. The entrance fee was only $5.00 for both of us (including coffee and donuts).

I wouldn't make a special 1,500 mile trip just to attend the antique radio meet in Bradenton but for an antique radio collector already in Florida what better activity could there be? The weather was just like a nice hot summer day in Buffalo—sunny with the high around 80° yet the meet was

This is the key I purchased at Bradenton. Can anyone tell me the age and what it was used for? The base is not original.

held inside the Stewart Elementary school in the cafeteria. Tables and chairs were available. The room was just comfortably filled with a few under 100 buyers and sellers.

We brought only one small box of items to sell but business was good. We sold well over half of what we brought and made enough to pay for more than three days of our trip expenses. Also, by setting up and selling, we had many more conversations with other collectors and that is the real reason we go to these meets.

My best purchase was a British key. I was told it was from World War II and that the spring clamp on the front was there to hold the contacts closed on continuous transmit in case of an emergency. I don't know a lot about keys but after looking this one over decided I wasn't at all sure that I believed this story. I think the key is flameproof and the clamp assures that the protective cover stays closed. Perhaps a reader can enlighten me about the age and use of this key.

We have attended this meet each of the last three years and hope to go again next year. It is a little jewel, especially for those of us from the North—allowing us an early start to the collecting season. For information call Norm Smith at (914) 792-0003 (After 6 p.m.).

A beautiful Scott All Wave as seen at the Cypress Gardens radio exhibit. A visit to Cypress Gardens is a must while in Bradenton for the meet.

The AWA Spring Meet

This meet was held in Bloomfield, NY on May 1, 1999. The weather for the event can be unpredictable. It's not unusual to have wind, rain or cold temperatures. But this year was perfect. The meet was advertised as starting at daybreak. I arrived at 6:30 a.m. to find four cars already there, but no one was yet set up in the flea market.

Whereas the Fall AWA meet is about the largest antique radio meet anywhere, the spring event is a much smaller affair. Some of the AWA members have told me that this is intended to be reminiscent of earlier AWA meets with a more friendly atmosphere and lots of socializing. I did notice that there was not a lot of early merchandise, but this is the case at most meets these days.

Because of the smaller crowd this was also an excellent opportunity to explore both the main museum and the Annex. Those of you who have never seen the collection in the Annex should make a point of going. It is definitely not just a storage area!

There was also the usual auction of surplus equipment from the Annex. As always, Ed Gable did a fine job with that. Prices were low and there were some bargains.

The ladies from the American Legion served a full buffet and begged everyone to come back for second and third helpings. There was a large variety and everything was tasty. The meal was followed by a short indoor auction of members' equipment. There was no charge made by the AWA for this service and, incidentally, only $2 was charged for set up in the flea market (no registration fee). Nobody beats these prices!

At this point the meeting was over except for the 25 or so AWA directors who stayed for the semiannual board meeting. The AWA is happy for interested members to stay and listen to the board discussions. This meeting was over 4 hours long and the previous meeting last November lasted 5 hours! Of course you may leave when

ever you wish but for a director such as myself, who got there at 6:30 a.m., it was a very long day!

I stayed in Canandaigua the two nights before and after the meet and thought about the times when the AWA Fall conference was held there. Many have told me they wish the conference could still be held in Canandaigua, but of course it isn't big enough. However, it would be big enough for our Spring meet and might even cause it to grow into a larger event! Do you have any ideas about this? Should we go back to the Canandaigua Inn? The museum would be 11 miles away. Should there be a bus? Where would the luncheon and the flea market be held? Should the new museum building be here? Write the editor with your ideas.

Ed Gable conducted his usual spirited auction of surplus from the AWA annex during the AWA Spring meet. This was also a great opportunity to view the Annex building, including the new display addition.

This year, we had beautiful weather at the AWA Spring Meet in Bloomfield.

LETTERS, *continued from page 11*

have a camera, you can still watch and listen. To participate, you need a valid internet connection and free software that can be downloaded from www.iVisit.com. For more info, go to www.Brighton-uk.com.

QCWA HONORS EX PREZ BRELSFORD

The Quarter-Century Wireless Association recently recognized Charles Brelsford's 75-year career as a licensed amateur. Chuck received his first ticket, 8BMU, as a high-school student in 1923. His first rig was a 202 to a T-type cage antenna operating CW on the 175-200 meter band. He spent 1928-1929 as radio officer on a Great Lakes passenger ship plying between Buffalo and Duluth. In addition to his original call, he has held the calls W8WW, W2CTA and the current K2WW.

Chuck was president of the AWA from 1973 to 1983, and is an Honorary Life Member of AWA as well as the Arizona Antique Radio Club. He joined QCWA in the 1970s while in Florida and is now a member of the Barry M. Goldwater chapter (Arizona Chapter #16).

In his note, Chuck tells us that he considers the *OTB* to be a first-class publication and, coming from this very knowledgeable and experienced gentleman, that's quite a compliment!

CORRECTION TO ARCHIVE ARTICLE

We recently received a correction to one of the "Articles From the Archives" posted on "*OTB On Line*." (If you haven't seen *OTB On Line*, you haven't yet browsed www.antiquewireless.org, the new official AWA web site!).

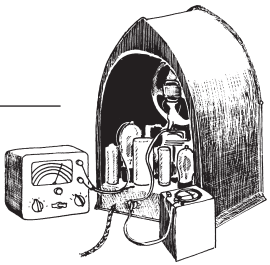
Dave Ivarson, W3WBE, writes that in the article *More on 60 Cycles*, the example of a six-pole alternator operating at 1800 rpm would produce a frequency of 90 Hz, not 60 Hz as stated.

NEW PRE-OCTAL AND COLLECTOR TUBE CATALOGUE

George H. Fathauer, former co-owner of the well-known Antique Electronic Supply firm, is now a dealer in collector's tubes. His new catalogue "Pre-Octal and Collector Tubes" is just out and features an attractive full-color cover featuring 48 collector tubes and boxes. For a free copy, write George H. Fathauer & Assoc., LLC, 688 W. First St., STE4, Tempe, AZ 85281. Phone (480) 968-7686; e-mail fathauer@home.com.

EQUIPMENT RESTORATION

EDITED BY **KEN OWENS**, 478 SYCAMORE DR., CIRCLEVILLE, OH 43113
PLEASE SEND CORRESPONDENCE DIRECTLY TO THE ABOVE ADDRESS, INCLUDING SASE FOR REPLY.



Defective by Design: Atwater Kent

Good design is hard to beat. Chevrolet used its 6-cylinder, valve-in-head engine in millions of cars for 20 years. Atwater Kent used the equally good design of its all-triode, TRF receivers in millions of mahogany and metal box sets. Although it was constantly refined and improved, the basic design stayed the same from 1924 to 1929. Despite their excellence, these sets have several weaknesses which have shown up over the years. The most common one is resistor failure.

There are two types of resistors in these sets. One is made of resistance wire wound on a flat Bakelite strip with grommets or lugs for the connections as shown at "A" in Fig. 1. The other consists of a carbon element in a glass tube with metal end caps as shown at "B." This type mounts in clips like a fuse.

All of these early sets used damper resistors in the grid leads of the triode RF stages to suppress oscillation because they were not neutralized. The resistors were the wirewound type "A," and were mounted on the rear of the tuning capacitors.

These resistors have a habit of opening up. Of the A-K sets I have restored, 65% have had one or more open damper resistors. The set won't play because the signal path to the grids is open. I rewind the dampers from a spool of insulated resistance wire which I acquired many years ago.

If you don't have any resistance wire (and I don't know where you can get it), you can repair the damper resistor by mounting a very small (⅛ watt) carbon resistor of the nearest value on the rear of the Bakelite strip where it will hardly be visible. You can also cover the carbon resistor with a piece of black shrink tubing to make it even less visible. I don't like to see modern parts when I look into the cabinet of an AK receiver. The broken resistance wire should be removed from the strip. Damper resistor values for the different models are shown in the table below.

The grid leak in Atwater Kent sets is the glass type "B." The later AC sets used the same type resistors for voltage dropping. *All* of the A-K sets I have restored have had bad carbon resistors. They have either increased greatly in value or are open. The grid leak is located on top of the detector-audio amplifier (DAA) module at the base of the detector tube except on the early Model 20C (7570) with UV tube sockets. Space

Atwater Kent Grid Damper Resistors

Model	Value (Ohms)
19	600
20	600
20C	600
21	600
24	600
30	500
30A	350
32	865
33	800
35	500 (below #900,000)
35	350 (above #900,000)
36	800

Model	Value (Ohms)
37	350
38	800
40	350
42	350
43	350
46	350
52	350
53	350
56	350
57	350
44, 45, 47	350 (stages 1 and 3)
	500 (stage 2)

limitations in this model did not permit placing the grid leak on top, so it was put under the detector socket on the DAA module. It doesn't use clips, but is a white glass tube with wire leads. In the Model 20C (7960) with UX sockets, the leak was put back in clips on top of the DAA module.

The grid leak can be replaced by soldering a small 2-megohm carbon resistor below the detector socket where it won't show. Leave the glass resistor in its clips for appearance, but disconnect the wires to the clips because the old resistor may be noisy.

The glass voltage-dropping resistors in the AC sets are mounted in clips on the under side of the connector board in the power supply box. Restoration of AK power supplies is a topic for another column, so I won't go into it now.

Another resistor which is commonly open is the detector grid return resistor used only in the battery sets and illustrated at "C" in Fig. 1. It was customary to return the detector grid to the positive leg of the filament supply, but A-K got better results by returning it to a point between the positive and negative legs. This improvement first appeared in the Model 20C. Section "X" is 270Ω and section "Y" is 180Ω. If the resistor has an open section, the entire resistor should be replaced with carbon resistors of the proper values. You can use 330Ω and 220Ω resistors if you don't have the original values. Other combinations can also be used as long as the ratio is 1:1.5. One-eighth watt resistors are fine.

There are other wirewound resistors in the AC sets for biasing the tubes and for voltage dropping. They are rarely bad. Therein lies the mystery. Most (91%) of the defective wirewound resistors I have seen carry little or no current! I have looked at the breaks under the microscope. There is no evidence of melting or corrosion; they are simply fractured. My explanation is that the resistance wire crystallizes over the years, becomes brittle and breaks from the tension in the winding. The resistors which carry current run warm and stay annealed so the wire doesn't get brittle. Another case of material failure.

Audio transformers are another problem. Half the A-K sets I have restored have had open audios, most often the secondary. I think this is a corrosion problem caused by acids in the impregnating compounds. I discussed this in *OTB*, Vol. 33, No. 4.

You can melt the bad transformer out of its can and replace it with a modern 1:3 ratio transformer inside the old can. I put the transformer on an aluminum pie pan with the open end up and heat it at 300° in the oven. When the tar is thoroughly molten, you can pull the old transformer out by its wires. Don't rush the process. If the tar is not soft, the wires will pull out and you will have the job of digging the core out. When the can is replaced on the DAA module, you can't tell it has been repaired. In the Models 20 and 20C (7570) both transformers were 1:3 ratio.

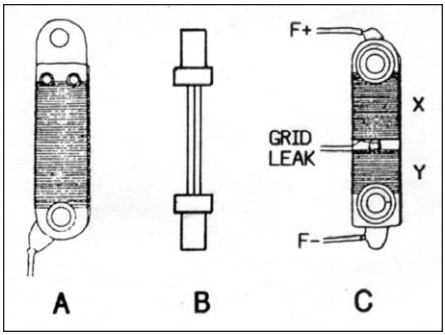


Fig. 1. Atwater Kent resistor styles (see text).

Beginning with the Model 20C (7960), the first audio transformer was changed to 1:5 ratio for greater volume. You can spot the change because this can has a larger diameter than the other can. Replacement is a problem because 1:5 transformers are not easy to find, especially of a size to fit the can. I use two of the very small modern units with the primaries connected in parallel and the secondaries in series for 1:6 ratio. They will both fit in the can. The ratio is a little high, but not as far off the mark as using a 1:3 transformer.

You may notice increased bass response with replacement transformers compared with all-original sets. This is due to the greater primary inductance of modern transformers.

♦ ♦ ♦ ♦

This interesting restoration problem is from John Kaetz, Jr., W4GVF, (Bessemer, AL).

John restored an Emerson Model 321, 8-tube receiver. After all the defective parts had been replaced, he found the set unstable between 650 and 750 kHz. It motorboated and would not receive a strong station at 690 kHz. Nothing seemed to help, and the tuning capacitor was not shorting. On a hunch, he bridged the rotor to the frame with a screwdriver and the problems vanished.

He inserted a piece of fine emery paper moistened with contact cleaner between the shaft and wiping contacts and rotated the shaft. This was repeated for each of the 3 wipers and cured the problem. John thinks it unusual to find corroded

(continued on page 20)

BREADBOARDING

EDITED BY **RICHARD A. PARKS**, 2620 LAKE RIDGE CT., OAKTON, VA 22124
PLEASE INCLUDE SASE FOR REPLY.

Bring Historical Circuits to Life On Your Workbench!

Meet the *OTB* Interpanel Receiver!

A few issues back, Author Parks mentioned that, as he completed one breadboard lashup after another, he was getting closer and closer to something resembling a classic interpanel (modular) receiver as marketed by DeForest, CRL, Amrad and others in the early 1920s. By the last issue, his receiver had grown to three panels: a loose coupler, a tuner, and a combination triode/crystal/coherer detector. Now the detector demonstration panel has been expanded to include a simulated Fleming valve and a new two-stage amplifier panel has been added. He must be through with the set now because current pictures reveal that he has housed the panels in a neat home-built cabinet!

Dick has dubbed this construction "The OTB *Interpanel Receiver." Following are notes on building the receiver. Additional details will be found in some of his earlier columns.*

There's been some interest in the "interpanel" receiver I've been mentioning in my last columns. So here goes the full treatment—get out your handsaws! The photos show the front and back views of the receiver as I put it together. I've also included schematics of both the basic 3-panel receiver and a fourth panel containing a two-stage audio amplifier. This amplifier will give lots of speaker volume on local stations.

The Receiver/Detector Demonstrator

The receiver is built on four pine boards, each about five by seven inches, with bakelite material from Antique Electronics Supply (6221 South Maple Ave., Tempe, AZ 85283, phone (602) 820-4643). I used cannibalized binding posts from the junk box. Of course, you can use a single base and a single panel if you like.

For the first panel, the loose coupler secondary is composed of 50 turns of wire around a five-inch long piece of four-inch plastic pipe. The inner primary coil is 15 turns of wire scramble-wound and arranged to rotate within the pipe over a range of 90 degrees. I made a shaft of a ¼-inch wood dowel, which protrudes through the panel and mounts a control knob. If you make one like this, leave slack in the primary leads to allow for free movement.

The tuning cap back of Panel #2 can be any old 23-plate variable from the junk box. A large 180° tuning knob would look good. A fancy vernier dial would look even better. Use brass hardware for brackets—it's non-magnetic. I installed a grounded piece of copperclad in back of panel #2, to minimize hand effects.

For Panel #3, the detector panel, a five-position selector switch connects the different detectors between the tuning tank and the 'phones output points. A five-position, two-pole switch is shown, but other choices are possible. If you have only a single-pole switch, for instance, do away with the other S1 poles and make the B battery and 957 connections with an SPST switch, a link, an extra binding post, or some other means.

The two 0.01 uf bypass caps are there reflecting good practice in design; you may find them unnecessary. If you use batteries rather than power supplies, the 300-ohm resistor across the bias battery may be omitted, but you'll find it useful to use a low-voltage variable DC source here.

Refer to the February 1999 issue of *OTB* for details of the coherer construction. I used a 3AG fuse body with its ends melted off, and filled tightly with steel filings. Wires from each end cap nearly meet within the unit and it will measure just about an open circuit on an ohmmeter. You have to tap it to bring it into conduction, and its output will vary with bias voltage. 12 or 15 volts should be the most you need.

Use any of the available catwhisker assemblies for the "vintage" crystal detector. The quality of the crystal itself will be critical to the performance of the set in this position. The 1N34 diode (fixed crystal) can be any germanium diode. Even a sil-

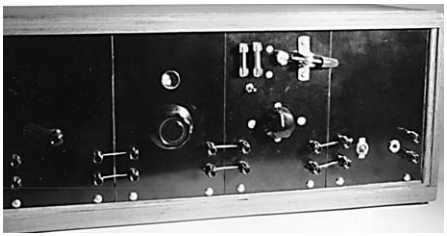
icon diode will work. You should try using very low values of bias voltage to "break over" the diode or crystal detector you are using into conduction. This will raise the output signal some.

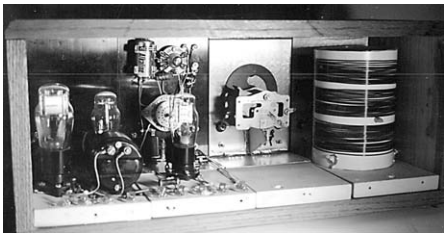
The 957 tube shown is connected as a diode to simulate a Fleming Valve. It is accessed in the fourth position of the selector switch. S1c turns on the filament. Bias voltage should be in the neighborhood of 1 to 3 volts. If you use a different tube, this may change. I used a C cell for the filament battery, but even an N cell would do.

The grid leak used with the '30 triode detector is not critical. About 2 megohms will work. If you use a period grid leak assembly better check the value of the resistor! And almost any old RF choke will do as long as it isn't open. Expect a gain of eight maximum out of a '30 tube—choose another type for more gain. And be watch your battery connections! It's easy to blow a two-volt filament!

Safety note: as with many old-time sets, there will be B+ voltage on the 'phone leads, and you can feel anything over about 35 volts. No need to go above 35 volts of B supply anyway.

Use the longest and highest antenna you can manage and keep the coupling loose for best selectivity. The set will work fine with sensitive 'phones and just the three panels, but for best results, use panel #4—the two-stage amplifier described below!





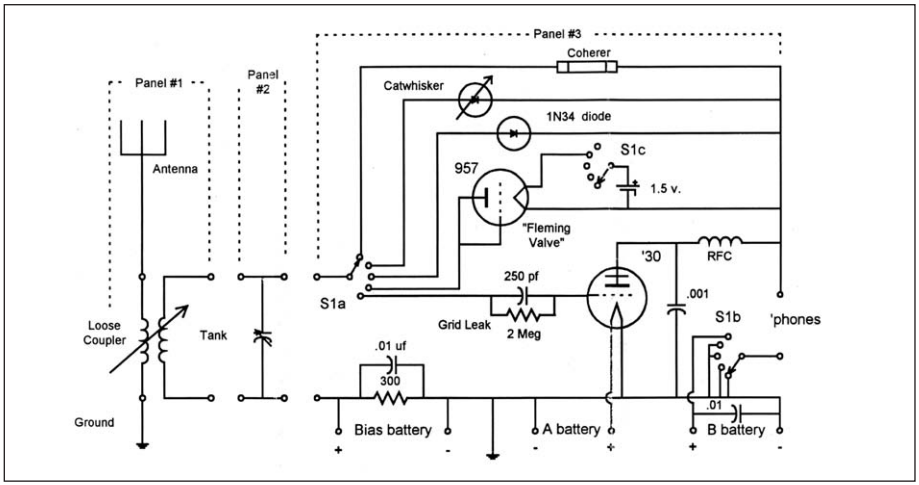
The completed interpanel receiver.

The Amplifier

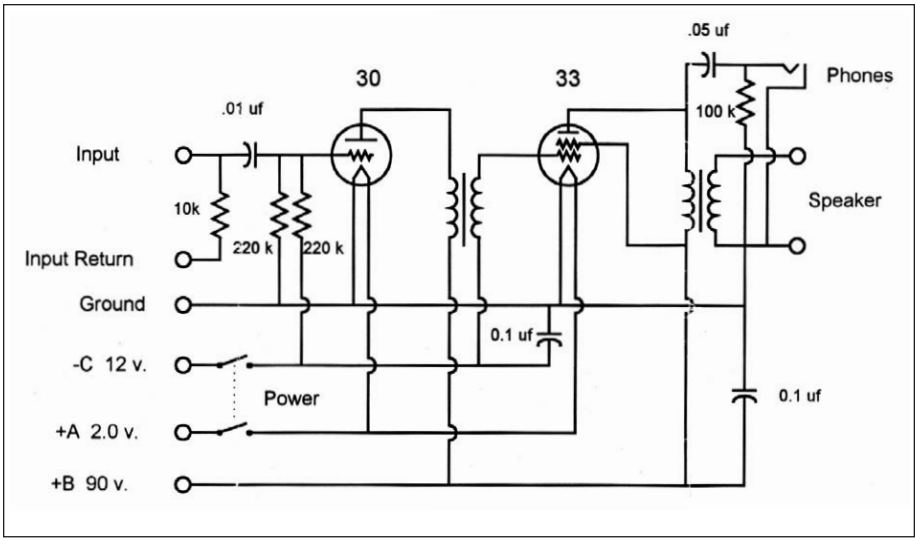
This two-stage amplifier connects to the 'phones output of the detector panel of the receiver. You will want the panel to be the same size and construction as the other panels. Using the '30 and '33 tubes shown, the amplifier will have an overall voltage gain of about 100. Here you can go as high as 90 volts for a B supply.

You can get the interstage transformer from AES; it can be a Stancor A-53 type, with a stepup ratio of 3 to 1. If you don't have one or want to purchase one, think about using R-C coupling to the '33 grid: 10K to 30 K for a plate load, 0.05 uf to couple, and 500 K for a grid resistor. This will cut the overall gain, though.

The output transformer should ideally match the 10K output impedance of the '33 tetrode. If your output transformer has a different primary



The Receiver/Detector Demonstrator. Selector switch allows instant comparison of classic crystal, fixed crystal, "Fleming Valve" and triode detectors.



The two-stage audio amplifier. RC coupling can be substituted for the interstage transformer between the two tubes (see text).

impedance, it won't matter much at all, so long as it matches a tube and not some transistor. You might use a unit from a junked portable radio, like I did.

With 90 volts on its plate, the '30 wants a grid bias of -6 volts, so the two 220 K resistors at its grid get that voltage from the -12 volt C supply. If you use dry cells for the C battery, omit the resistor to ground and just connect the remaining grid resistor to a -6 volt tap.

You may omit the two 0.1 uf bypass capacitors unless your amplifier tries to oscillate. Mine did! More B+ voltage won't get you any more gain to speak of. If you must have a volume control, use the antenna coupling control—you can reduce volume and achieve better selectivity at the same time.

With one volt peak-to-peak at the input, you will get about one watt into the speaker.

Next time we'll put together an el cheapo AC power supply for this and other radio stuff we'll be fooling with!

EQUIPMENT RESTORATION, *continued from page 17*

wiping contacts and I agree. Such contacts normally stay clean from friction, but maybe years of disuse allowed corrosion to creep in.

♦ ♦ ♦ ♦

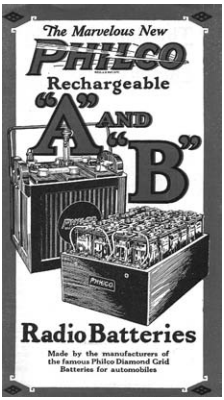
Your editor recently encountered an unusual tuning capacitor problem. I restored a set for a friend who had cleaned the chassis and variable capacitor. He had done a good and careful job, and the chassis was bright and clean. After the usual parts replacements, I aligned the set and attempted to calibrate it. I calibrated at 600 kHz and then at 1500 kHz. When I tuned back to 600 kHz, it was way off. I went through the procedure again with the same results. After several futile attempts, I carefully inspected the variable capacitor and noted oil droplets between the plates.

I washed off the oil with mineral spirits and recalibrated. This time the calibration held. My friend told me he had sprayed the capacitor with WD-40 to free it up. The value of a capacitor is a function of the dielectric constant of the material between the plates. For a variable, the material is supposed to be air. Oil has a higher dielectric constant than air, so oil between the plates will increase the capacitance. As the tuning is varied, the oil is distributed unpredictably, so that the capacitance for a given setting will not be reproducible.

If you need to lubricate a variable, don't be too generous with the oil. Put only a small drop on the bearings and the wipers. I use sewing machine oil to which I have added some powdered graphite. This mixture is conductive, so don't get it on any insulated areas.

Philco Images: 1920-1954

Last year at this time, through the kind cooperation of the keeper of the Zenith corporate archives, we were able to present a collection of photographs celebrating the company that was the theme of our 1998 conference. This year, we called on our Internet columnist and resident Philco expert Chuck Schwark to help us do something similar for this year's "conference company." He dipped into his collection of literature and radios, and here's what he came up with. Thanks a lot, Chuck!



Clockwise, from top: 1. Philco "lightning bolt" radio logo circa 1928. 2. Introduced in the depression year of 1931, the Model 70 "cathedral" was a smash hit. 3. A Model 38-7XX is shown with its family in a 1938 magazine ad. Over a quarter million were sold. 4. Originally a storage battery manufacturer, Philco got its start in radio through the marketing of rechargeable "A" and "B" batteries. This sales brochure dates from 1920. 5. Stock certificate circa 1954. 6. Parts department of Philco distributor Harvey Moll, Inc. (from Philco Serviceman, August, 1936). 7. Philco branded vacuum tube (1935).

BY JAMES P. RYBAK

"Forgotten" Pioneers of Wireless

Part 5 — Karl Ferdinand Braun

Jim Rybak has contributed many articles on the early history of radio communications to the OTB. *Previous parts of the present series have covered the work of Nathan Stubblefield (May, 1997), Dr. Mahlon Loomis (August, 1997), Fr. Joseph Murgas (November, 1997) and Charles D. Herrold (August, 1998). Jim's "Early Mechanical Detectors for Continuous Wave Wireless Telegraphy" appeared in the November, 1998 issue, and his two-part article "Reginald A. Fessenden and the Development of Radiotelephony" (November, 1996 and February, 1997) won the 1997 Bruce Kelley-OTB award.*

Though Karl Ferdinand Braun shared, with Guglielmo Marconi, the 1909 Nobel Prize in Physics for achievements in wireless telegraphy, he is rarely remembered for that honor. He is better known for building the first cathode ray tube (CRT), or "Braun tube" as it is still known in Germany, in 1897. The CRT has been cited as second in importance in the fields of communication and physics only to DeForest's audion in the fifty-year period that followed [1].

In 1909, the future importance of the CRT was not at all clear to the Nobel Prize Committee members. What was clear, however, was that wireless telegraphy already was profoundly changing the way the world communicated. It was for this reason that the Nobel Prize Committee recognized the separate, but equally important, complementary wireless telegraphy achievements of Braun and Marconi. While Marconi's accomplishments were more spectacular and much more highly publicized, Braun's achievements were no less important to the overall development of wireless telegraphy.

Karl Ferdinand Braun was born on June 6, 1850 in the German city of Fulda. Not surprisingly, early in his life Ferdinand Braun demonstrated that he was a diligent student with a strong talent for science. Before he finished his gymnasium (high school) studies, several journals had published scientific articles by the young man [2].

Initially intending to be a gymnasium science teacher, Braun began a general science and mathematics curriculum at the University of Marburg. Soon, however, he transferred to the University of Berlin where he focused his studies on physics and ultimately was awarded a Ph.D. [3].

Braun's interest in the electrical conductivity of metal salts in solution (electrolytes) ultimately led to his study of metal sulfide crystals and other crystalline solids which conduct even when not dissolved. After much experimentation, Braun reported in 1874 that for many metal sulfides the electrical resistance varies with the magnitude and polarity of the applied voltage. He found this phenomenon to be especially true if at least one of the electrodes was a pointed wire.

In other words, Ferdinand Braun had discovered the point-contact rectifier effect. This effect had no practical application at the time but would be rediscovered over thirty years later in the form of the "cat's whisker" crystal radio detector and would be instrumental in the point-contact transistor first produced in 1948 [2, 3, 4, 5].

The next twenty-odd years of Braun's life were occupied with university teaching and physics research, most of which involved some aspect of electricity. During this period, he developed several electrical measurement instruments of importance to the physicists of that day. His next contribution of truly lasting significance, however, did not come until 1897.

The existence of electrons ("cathode rays")

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had been established that year and x-rays had been discovered only two years earlier. Both were of great interest to Ferdinand Braun. It was known that if high voltage were applied between two electrodes in an evacuated (low pressure) glass tube, electrons were emitted from the cathode and traveled to the anode. It also was known that certain materials would luminesce when struck by the electrons [2, 6].

This information was all Braun needed in 1897 to build what he called his "cathode ray indicator tube." (The term "cathode ray tube" without the word "indicator" included was often used in those days to refer to any evacuated tube used for studying the effects of cathode rays.) [2, 6].

Numerous phenomena characterized by oscillatory electric voltages and currents were becoming increasingly important to physicists. Electromechanical oscillographs, using tiny mirrors to project a beam of light on a screen, existed which could display the waveforms of the 50 or 60 Hz voltages produced by power stations. However, these instruments were not able to function at higher frequencies [2, 6].

In Braun's original CRT, the oscillatory electrical current to be observed flowed through a coil wrapped around the discharge tube. This resulted in a vertical deflection of the electron beam. The amount of vertical deflection was proportional to the intensity of the oscillatory signal being measured. The trace on the face of Braun's CRT was merely a vertical line. What we today would call "horizontal deflection" of the image to create a "time" axis was achieved by means of a small rapidly rotating mirror placed in front of the CRT. Electrostatic horizontal deflection of the electron beam was first achieved by one of Braun's assistants some thirteen years later [2, 6].

Characteristic of Braun's attitude toward scientific discovery, he never patented his cathode ray indicator tube. Rather, he published a detailed description of how his tube was constructed so that any scientist could build one [2, 6].

Ferdinand Braun became involved with wireless telegraphy early in 1898. He had been hired by Ludwig Stollwerck to explain the technical principles behind a working system for underwater wireless telegraphy, which had been developed by three scientifically untrained men. It also was hoped that Braun would be able to suggest ways to increase the range of the telegraphy system. Stollwerck was a highly successful Cologne candy maker who had been approached to provide the money needed to develop and market the underwater communication system.

In the course of making himself familiar with the then-existing state of wireless telegraphy, Braun soon became aware of the work of Lodge, Slaby, Marconi, and others. Braun was interested in determining why both Marconi and Slaby were finding it difficult to increase the distances over which their transmissions could be received. The approach both had used involved increasing the voltage (and, hence, energy) of the spark transmitter discharges. However, large increases in the spark voltage resulted in only small increases in the distances spanned. Although Marconi had transmitted as far as 50 km, success beyond 15 km required disproportionately larger amounts of electrical energy.

Ferdinand Braun studied the design of Marconi's transmitter, which had the spark gap connected directly between the antenna and ground. Braun remembered that, to increase the range of the underwater telegraphy system, he (Braun) had changed the original circuit which also had the antenna directly coupled to the spark discharge. In Braun's improved arrangement, a primary coil was placed in the oscillation producing spark gap circuit. That coil and a loosely coupled secondary coil were used to transfer energy to the antenna. The effective communication range of the underwater system had increased even more when both the oscillator circuit and the antenna circuit were in resonance [2].

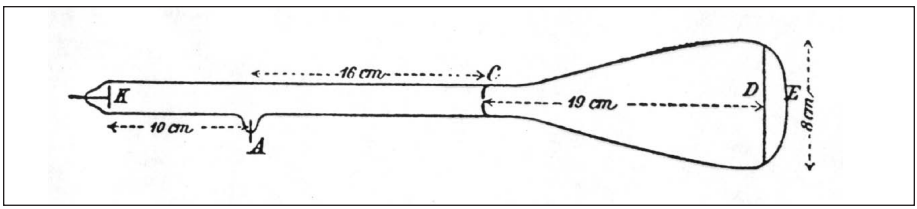

Fig. 1. Braun's cathode ray indicator tube.

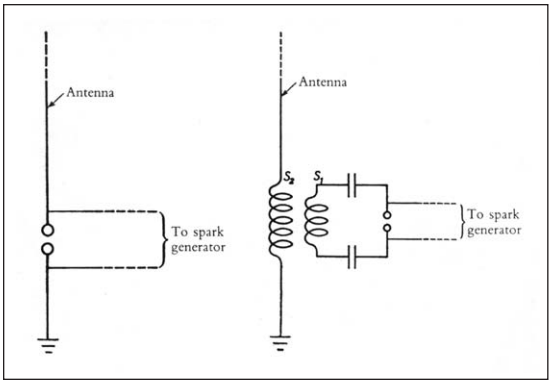

Fig. 2. Direct or "tight" antenna coupling circuit (left) and Braun's "loose" coupling circuit (right).

Direct coupling (also called "tight" coupling) of the antenna to the oscillator resulted in the production of bursts or pulses of highly damped oscillations. Much energy was dissipated in circuit losses. The highly damped pulses of oscillations were not effective for long distance communicating. The radiated energy was spread over a wide range of frequencies resulting in interference to other stations due to the inability to tune receivers to a particular frequency. Direct coupling of the antenna was limiting the range of Marconi's transmitter.

The "loose" coupling, which Braun now used between the spark-gap oscillator circuit and the antenna circuit, produced considerably less damping of the pulses of oscillations. The effect of low damping was highly beneficial in that much more energy was radiated and the energy was distributed over a much narrower range of frequencies [7]. Making the two circuits resonant further increased the amount of energy transferred to the antenna.

The range of the underwater wireless telegraphy system still was limited to relatively short distances due to other factors. However, Braun's use of loose coupling between the oscillator and antenna circuits of a conventional wireless transmitter now dramatically increased the range of aerial (i.e., through air) transmissions. This was demonstrated by Braun in a hastily improvised test on September 20, 1898 [2].

Within a month of his initial test, the normally conservative Braun predicted that his aerial wireless telegraphy equipment now would be able to span distances of 100 km. Stollwerck and his partners who wanted to form a corporation for developing and marketing wireless telegra-

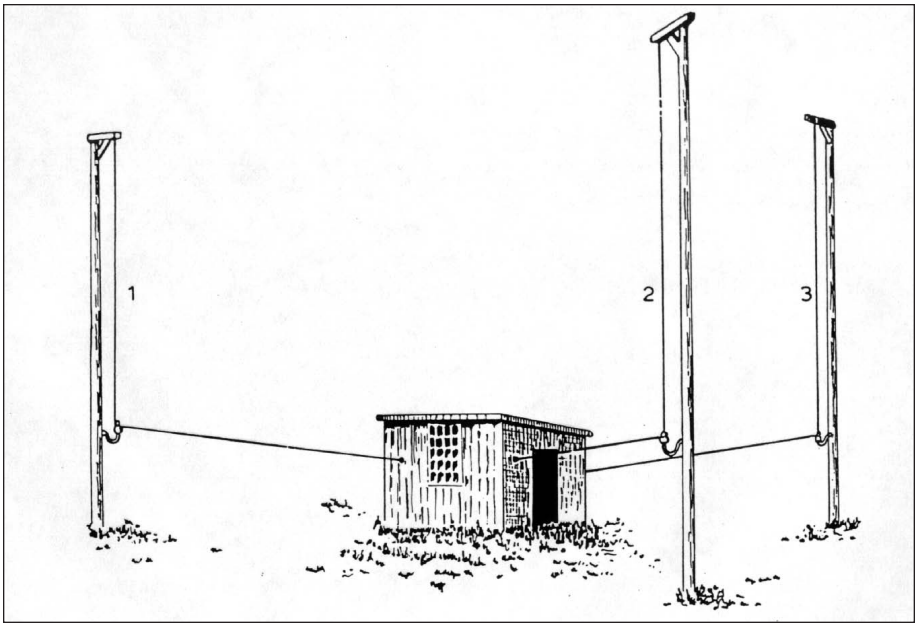

Fig. 3. Braun's triangular antenna arrangement.

phy equipment for military and commercial applications were jubilant. Braun's improvements effectively eliminated Marconi's previous patent monopoly on wireless telegraphy. The new company, which would be known as "Telebraun," was formed and the company filed an application for a patent on Braun's circuit. (After several subsequent mergers and name changes, the company with which Braun was associated would be called "Telefunken.") [2].

Braun knew that having an improved receiver also was critically important to achieving a truly commercially successful system of wireless telegraphy. As did many others, Braun realized that the coherer detector was, at best, temperamental and unreliable. In 1899, he tried to utilize the crystal rectifier effect, which he had first discovered in 1874. Braun found that the crystal detector provided no improvement over the coherer when the wireless telegraphy messages were automatically recorded on a moving strip of paper, as was the normal practice at the time.

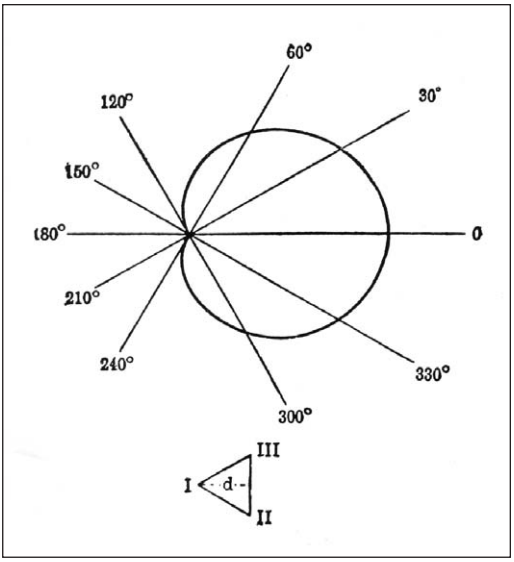

Fig. 4. Directional radiation pattern from Braun's triangular antenna array.

By 1901, the advantages of having a human telegraph operator decipher and manually record the messages were recognized. Then Braun's crystal detector was found to be superior to the coherer. However, when transmitters which produced continuous, undamped oscillations became available, neither the coherer nor Braun's crystal detector could produce an audible response. Braun's crystal detector, however, was "rediscovered" and improved in a few years by others for use as an inexpensive and reasonably reliable detector for radiotelephony [2].

Braun reasoned that if loose coupling between the oscillator and antenna benefitted the performance of the transmitter, it might also improve the performance of the receiver. In 1902, he carried out experiments which demonstrated that transferring energy from the receiving antenna to the detector through two loosely coupled coils resulted in both a sharper resonance effect as well as increased received signal strength [8].

The benefits to reliable long distance communication which resonance at both the transmitter and receiver provided were obvious to all who were seeking to develop wireless telegraphy. Marconi had been trying to achieve the same result. Everyone, especially Marconi, knew that the person who held the strongest patent on tuning would accrue great financial rewards.

Marconi filed an application for what would become known as his "four-sevens" tuning patent for transmitters on April 26, 1900. Braun felt that Marconi's was very similar to the first part of Braun's own British patent on tuning which had been filed on January 26, 1899. In addition, Braun also felt that subsequent tuning patent applications filed by Marconi in 1901 were remarkably similar to the second part of his (Braun's) British patent [2].

Braun reported that, when the two men later discussed the matter, Marconi admitted with "commendable frankness" that he had "borrowed" Braun's ideas. For some unexplained reason, Braun-Siemens (the new name of the company with which Braun was associated) did not immediately sue Marconi. When a suit was filed later, the company found that its delay had severely weakened its legal position [2].

Being able to tune the transmitter and receiver helped provide privacy in communications as well as greater communication range. This was very important to both military and commercial users of wireless. In 1901, Braun sought to increase both the privacy and range even more with the development of directional antennas.

One of Braun's first findings was that a moderate amount of directivity in receiving could be achieved if the antenna was inclined slightly (less than ten degrees) to the horizon. Reception was best for waves that passed through the vertical plane containing the antenna [8].

Achieving directivity in transmitting antennas

was somewhat more complicated. Braun first tried to replicate the action of the parabolic mirror in a searchlight by using an array of vertical antenna wires mounted on poles arranged to form a cylindrical parabola. By properly adjusting the phase of the signal applied to each wire, it would be possible (in principle) to produce a direction of maximum electromagnetic wave intensity [2, 9]. Achieving the desired results in practice, however, is very difficult with an antenna configuration of practical size. Braun's results were unsatisfactory.

Braun then reduced the number of antenna wires and poles to three and was able to excite the wires from a common transmitter by arranging the poles in an equilateral triangular pattern. By carefully controlling the relative phases of the transmitter currents in the three wires, significant directivity of the radiated signal was achieved by Braun and his assistants [8, 9].

Shortly after World War I began in Europe, Braun came to the United States to testify in a patent dispute. The subsequent involvement of the United States in that war, together with an incurable illness, made it impossible for Braun to return to Germany. He lived at his son's home in Brooklyn, NY until his death in 1918 [1, 3].

In the minds of many, Karl Ferdinand Braun's contributions to the development of wireless telegraphy are obscured by those of Marconi. The reason for this largely is due to the personality differences between the two men. Unlike Marconi, Braun avoided publicity and sought no personal recognition for his work. Braun saw his work solely in terms of helping advancement of science.

The significance of Braun's work, however, must not be underestimated. That significance is best summarized by the following remarks by H. Hildebrand, President of the Royal Swedish Academy of Sciences, in the presentation speech made prior to the joint awarding of the 1909 Nobel Prize in Physics to Braun and Marconi:

Marconi's original system had its weak points. The electrical oscillations sent out from the transmitting station were relatively weak and consisted of wave-series following each other, of which the amplitude rapidly fell—so-called "damped oscillations." A result of this was that the waves had a very weak effect at the receiving station, with the further result that waves from various other transmitting stations readily interfered, thus acting disturbing (sic) at the receiving station.

It is due above all to the inspired work of Professor Ferdinand Braun that this unsatisfactory state of affairs was overcome. Braun made a modification in the layout of the circuit for the dispatch of electrical waves so that it was possible to produce intense waves with very little damping. It was only through this that the so-called "long distance telegraphy" became possible, where the oscillations from the transmitting station, as a result of resonance, could exert the maximum possible effect upon the receiving station. The further advantage was obtained that in the main only waves of the frequency used by the transmitting station were effective at the receiving station. It is only through the introduction of these improvements that the magnificent results in the use of wireless telegraphy have been attained in recent times [10].

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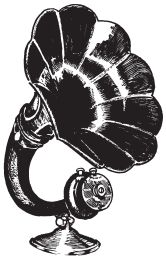


THE LOUDSPEAKER

EDITED BY **FLOYD A. PAUL, W6THU**, 1545 RAYMOND, GLENDALE, CA 91201
PLEASE INCLUDE SASE FOR REPLY.

Jewett Horn Speakers

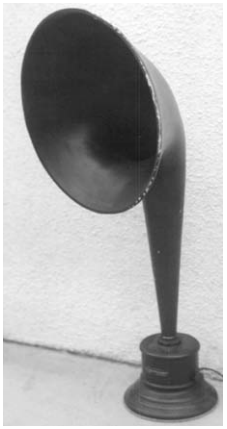
The Jewett Radio and Phonograph Company began operations in Detroit, Michigan in 1924. By April of 1925, the company had moved to Pontiac, Michigan. The company first advertised its "Superspeaker" in the June, 1924 issue of *Radio News* magazine. This upright horn was to be advertised for the next eighteen months in *Radio, Radio Retailing, Radio Broadcast, and Radio News*, among other publications.

Jewett was also to introduce three other horn speakers. *Radio Retailer & Jobber* for September, 1925, announced that the company was releasing a cabinet horn speaker, the "Superspeaker Console." In the same month, *Electrical Record* referenced a "Superspeaker Highboy," noting that the cabinet was 54¾" high and weighed 150 pounds. (It is thought the horn in the highboy was a cabinet horn speaker). *Radio Retailing* for November, 1925, had an announcement of a "cone" shaped reproducer with a horn hidden beneath the cloth cover.

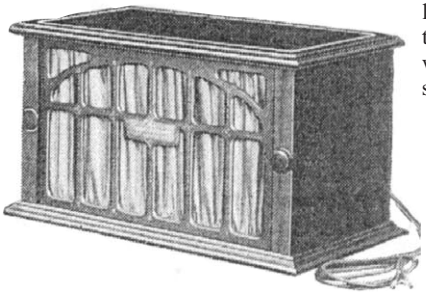
But just a few months later, in January, 1926, *Radio Retailer and Jobber* observed that the company was "abandoning" horns, thus terminating the very successful product line that had been dominated by the Superspeaker.

The first ad for the upright Superspeaker horn noted that a micrometer tuning adjustment was available in the base. The text of the ads during the eighteen months of advertising used many superlatives in describing the qualities of the horn. The design apparently didn't change during its lifetime. A February ad of 1925 stated that the driver unit was made by Vemco. (Vemco manufactured drivers for many other horn speaker manufacturers, and the author's Jewett Superspeaker has a Vemco driver unit in it).

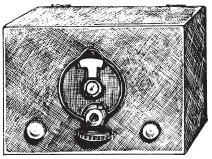
Superspeaker horns have shown up in many collections and it is estimated that between thirty and forty thousand were made and sold by 1926. The elegant looking unit stands some thirty-one inches high, and was one of the tallest horn speakers ever manufactured.



Above: Jewett "Superspeaker" from author's personal collection. Below: The cone model had a standard horn hidden inside.



The Jewett cabinet model was dubbed the "Superspeaker Console."



Turn Your 1929 Hartley into an "OT Contest" Rig

By Bob Raide, W2ZM

Bob Raide has done it again with his prolific building. This time he has submitted an excellent article on how to convert his type 27 Hartley "1929" contest transmitter (see this column for August, 1998) to an MOPA suitable for the "OT" contest. Judging from comments made to Bob, and also to me, his earlier TX was quite popular and quite a few were made. His current scheme should make a welcome addition to that rig or any other Hartley.

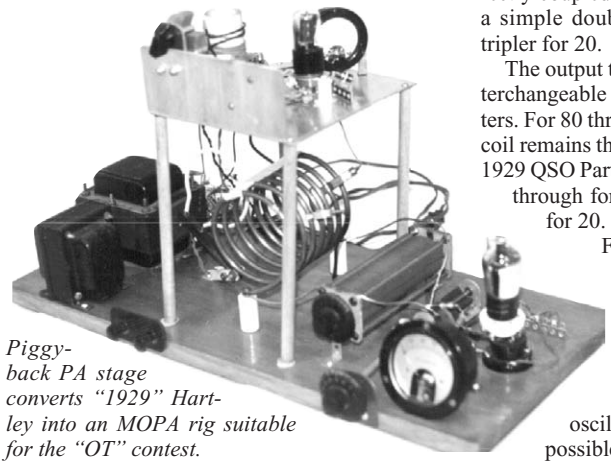
Don't forget the Bruce Kelley Memorial QSO Party coming up this fall. We will again have two weekends, as earlier suggested by Bruce. This hopefully will circumvent other contest QRM, rotten weather on one weekend, etc. The dates this year will be the weekends of December 4-5 and December 11-12.

Complete details, rules, etc. will be published in the November OTB*. Log sheets will be sent out to all those who submitted logs last year. Anyone else needing a log sheet please write. Incidently I would appreciate any input concerning date selections for our contests. Jim, W9KV, and Jim, W8KGI, have both been very helpful in this regard.*

Hope to see you all in Rochester in September!
—JR

If you built the 1929 QSO Party oscillator/transmitter featured in my article in the August 1998 *OTB*, it will be a simple matter of a few parts and a tube to realize four band operation that will put you in the running for the "OT" contest. However, most any self excited "1929" transmitter can be adapted with the following retrofit.

Before you start, be sure the original transmitter is working and in good order. It should be as chirp free as possible and have as good a note as possible. For, of course, the added frequency multiplication will also multiply any deficiencies.



Piggyback PA stage converts "1929" Hartley into an MOPA rig suitable for the "OT" contest.

The basis of the "OT" Contest requires 160, 80, 40, and 20 meter operation. The 1929 oscillator/transmitter handles the 160 and 80 meter portions but surely is too unstable for reliable use on 40, and most certainly on 20, when directly coupled to an antenna. What is needed is a simple doubler circuit for 40 meters and a tripler for 20.

The output tank circuit is constructed with interchangeable coils for 160, 80, 40 and 20 meters. For 80 through 20 meters the oscillator tank coil remains the same as is normally used for the 1929 QSO Party, with the final operating straight through for 80, doubling for 40 and tripling for 20.

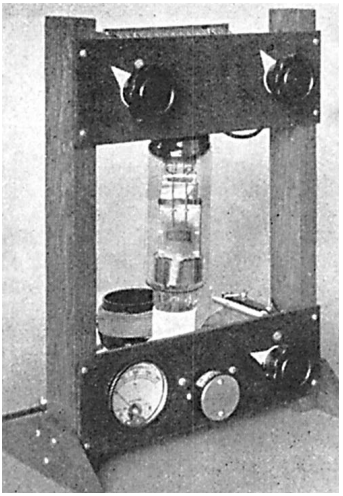
For 40 meter operation the oscillator will be tuned to between 3510 and 3530 kHz, approximately, while for 20, the oscillator will be tuned to 4690 kHz, plus or minus, for tripling to take place.

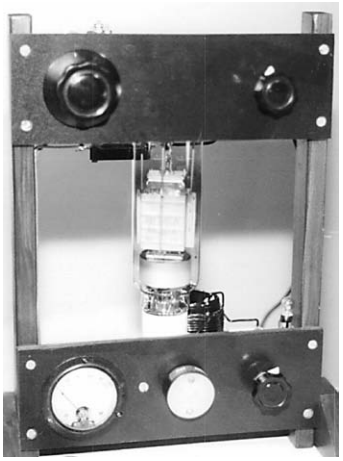
It is especially desirable for the oscillator coil to have as few turns as possible in order to achieve the highest

"Q" practical. Eight to twelve turns is best, depending on the coil diameter and tubing size.

For 160 meters, straight through operation will be used, but the oscillator coil will have to be changed. See the August, 1998 article for both 80- and 160-meter coil specs.

There are several good tube choices for this "PA" stage. The "OT" contest rules call for prewar type apparatus and tube types. The 6L6, 6V6, 6F6, and even the 6K6 are all good choices

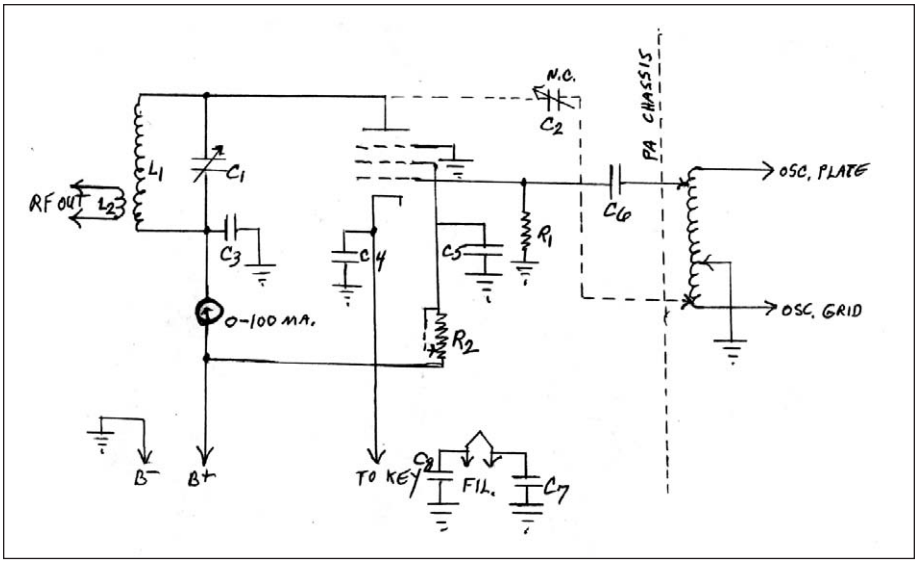




Dick Bauer, K5RB, sent this photo (below) of his meticulous copy of an oscillator originally built by George Grammer (above) and published in the 1936 ARRL Handbook. The tube is an RK20 pentode.

PARTS LIST

CHASSIS	Any thin piece of aluminum or tin will do. I found a knocked over "No Parking" sign on the edge of the road, cleaned it up with paint stripper, and put a burnished finish on it with steel wool. The legs were made of wooden dowel from the hardware store, and four velcro tabs hold the assembly to the oscillator baseboard.
L1	160M—55 turns of no. 18 coated solid wire close spaced 80M—30 turns as above 40M—13 turns as above 20M—7 turns spaced with about ⅛-inch between turns Above coils are wound on 1½-inch plug-in forms (Hammarlund, National, etc.) found at hamfests. Four-pin will due fine. You might also make the forms by epoxying PVC pipe to burned-out tube bases.
L2	160M—6 turns 80M—4 turns 40 and 20M—3 turns
L2	Can be moved closer to the hot end for more coupling or cold end for less.
C1	Small variable condenser. 50mmf will work fine for 40 and 20M; 150mmf will be required for 160M.
C2	Optional neutralizing condenser. Small trimmer or "midget" variable 2-10mmf (necessary if triodes are used straight through).
C6	100mmf Grid blocking coupling condenser
C3,4,5,7,8	.002-.01 600V. bypass condensers
R1	100k ½-watt grid leak (10K if triode is used for sraight-through operation)
R2	18K 2watt (can be a "pot" for adjusting power input)



Schematic for Bob's add-on PA. Neutralizing circuit (dashed lines) is necessary if a triode is to be used, as would be necessary for 1929 contest operation (see text).

and widely available. The little 6K6 is a favorite of mine. At 300 volts it easily draws 15 mils and I have worked several Europeans with it!

If you use the venerable 6L6, you can run from 3 watts up to 25 watts input by simply adjusting the screen voltage. This is done by varying the value of the screen dropping resistor. Use a 2-watt "pot" for continuously variable power or just a toggle switch and extra resistor to switch between, say, 5- and 25-watt operation.

In past months I have received requests for a "1929" QSO Party MOPA of simple design. The 6L6 family would not be suitable for the PA, being circa 1936. Not even the types 46 or 47 are early enough. It will be necessary, from a practical standpoint, to use triodes in straight through operation to be "legal" 1929. The same simple circuit presented here can be used with the addition of neutralization. The necessary neutralizing voltage is available at the grid end of the Hartley tank coil, as shown in the diagram.

A type 27, 26, 45, 10, etc. would be legal for the 1929 QSO Party. Though such older triodes could also be used for "OT" Contest work, they are of rather low mu and make poor frequency multipliers. There were a couple of tetrodes that were introduced in or before 1929; the types 24 and 865. I have used the type 24 with some success in this multiplier circuit, but could comfortably run only about five watts input. The fragile elements appear incapable of handling the higher currents necessary for transmitting purposes. The 865 is a scarce tetrode and I have never found one to test.

Now that you're ready to put together the simple add-on "PA," here are a few tips on "sprucing" up that 1929 oscillator set to be ready for the "daylight DX" bands.

1. Try other tubes of the same type—they will all sound different in the oscillator, even if they happen to have the same lot numbers.

2. Try to find NOS (new old stock) new full emission tubes of later manufacture. An example is the later small shouldered type 27.

3. Use ceramic transmitting-type variable condensers in the oscillator tank circuit.

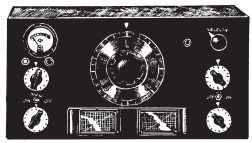
4. Connect the tank inductance and capacitance using heavy copper wire or copper strap.

5. Of course, a hefty power supply and rectifier for best possible regulation is always helpful.

Drop me a line or call with your questions or experiences.

73, Bob Raide, W2ZM
431 S. Wilbur Avenue, Syracuse, N.Y. 13204
315-476-7328, weekends 315-536-7186

THE COMMUNICATIONS RECEIVER



EDITED BY **WILLIAM FIZETTE, W2DGB**, RR 1, BOX 55, HENRYVILLE, PA 18332
PLEASE INCLUDE SASE FOR REPLY.

Some Notes on the National NC-46

A few years ago we presented in this column (*OTB* Vol. 31, No. 1, May, 1990) an article by Ed Gable, K2MP, along with supplemental comments by the Editor, Lud Sibley, on restoring the circa 1945 National NC-46 receiver. At the time we didn't have access to the Alan Douglas picture archives, so we would like to present some of these superb photographs now.

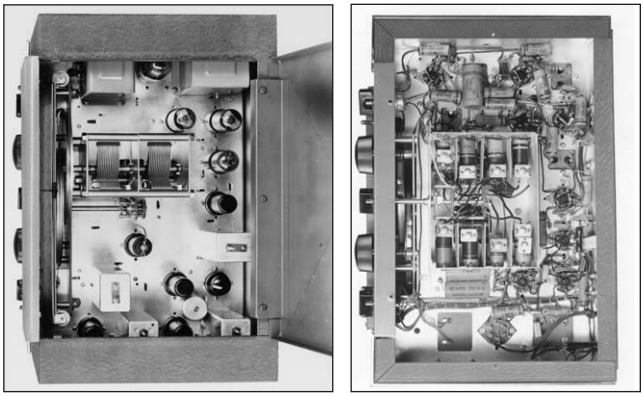
The NC-46 with its matching NC-46TS speaker.

I would like to emphasize that this is a *Hot Chassis* receiver without a polarized plug. Furthermore the lid is easily removed, providing easy access to the hazardous chassis. Be very careful when you work on this radio! The *OTB* issue already noted has an excellent follow-up article by Lud Sibley on the hot-chassis set. This is 'must' reading.

This was not the first National AC-DC receiver. That distinction goes to the pre-war 80/81 pair designed by Jim Millen's team. An important difference was that the pre-war designs had lids that were screwed down, protecting the user from a casual indiscretion that could be deadly. The earlier sets also used the famed sliding-coil assembly, while this version has the much cheaper conventional band switch.

Sams Photofacts #469-26 (December 1946) lists this radio as having ten tubes, with a pair of 25L6s in a push pull three-watt audio output stage. The IF is 455 kHz, and them is no RF stage or crystal filter. Coverage is 500 kHz to 30 MHz in four bands. The matching speaker was the National NC-46TS.

The writer wonders why the National Company even brought this radio to the market, as it could not have had much of a sales forecast. Perhaps some of the old-timers promoted it as an attempt to feel out the market for AC-DC communications receivers. It would have made a good shipboard entertainment receiver. Not having seen many, my feeling is that they are not too plentiful today.



Left: Construction was meticulous; a hallmark of the National products. But the easily lifted NC-46 cover gave ready access to the hazardous chassis inside. Right: The folks who wired on National's assembly lines must have had a straight edge in one hand and a soldering iron in the other!

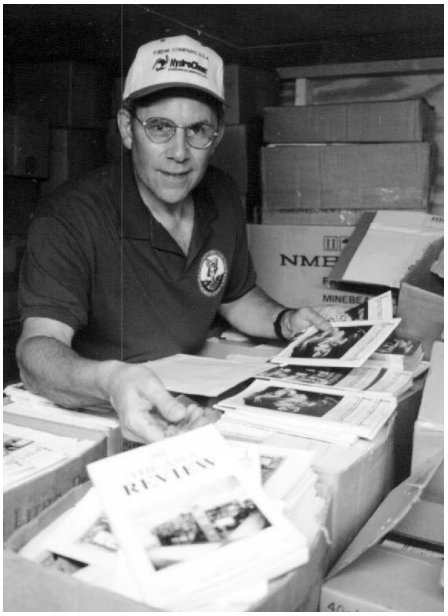
Behind the Scenes at the Museum Annex

This picture story is a spinoff of the expanded coverage being planned for the AWA Museum pages on our new AWA web site (http://www.antiquewireless.org). When completed, there will be virtual tours of both the museum building itself and the museum annex. The annex is primarily a storage and work area for the museum staff, but also includes significant exhibit space. Since the annex "tour" was finished in

(continued on page 34)

***Left:** Registrar Wenrich verifies a DeForest Double-Wing Audion in the tube room. But we really wish he'd use both hands!* ***Right, Above:** Ron Walker, WA2TT, in one corner of the Communications Storage Room. Ron and Elmer Wagner, W2BNJ, keep the ham stuff in good order.* ***Right, Below:** Mani Pires checks out a power transformer from the parts room. It's on its way to a member restoring a Gross 25 transmitter.*

BY EDWARD M. GABLE, K2MP, CURATOR, AWA ELECTRONIC COMMUNICATION MUSEUM
187 LIGHTHOUSE RD., HILTON, NY 14468



Left, Above: *It is the museum folks who handle* OTB *back issue and mail order AWA Review sales. Here Stan Avery, who is the AWA Treasurer in addition to being a museum volunteer, pulls copies for shipping.* ***Left, Below:*** *Volunteer Paul Feldman does a database verification check. Maintaining an accurate inventory of the collection is a constant endeavor.* ***Right, Above:*** *All new acquisitions must be identified and registered. Facilities Manager Mani Pires (right) looks up an item in one of the museum's references as Registrar Jack Wenrich, K2RY, prepares to log it in.* ***Right, Below:*** *Following a tradition established by our founders, the museum often "hits the road." Here, AWA Vice President Ron Frisbee (left) and I are set up at the dedication of a 1913 Marconi radio tower in Binghamton, NY.*

All photos by George Platteter.

BEHIND THE SCENES, continued from page 32

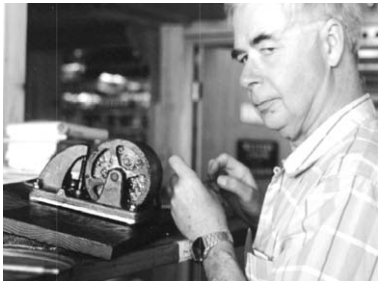
time to appear in this issue of the OTB*, we decided to give our readers a look at it in print form. It will give you just one more excuse to attend our Rochester Conference, where you can visit both the museum and the annex in person!*

I'd like to invite our readers to take a look behind the scenes and see just what it takes to run their museum. We'll show you how materials are brought into the facility, recorded, stored, and repaired. We'll also give you a look at the untold other tasks required to keep the museum operating.

Most of this work is done in the Museum Annex, or storage building, which is situated less than a mile down the road from the museum proper. It is located on property owned by the AWA, and consists of three interconnected buildings that were constructed, one at a time, over a period of twelve years.

The original building was strictly for storage and had no heating or cooling. The second one, which is now the Bruce Kelley Memorial Research Library, is well-insulated and equipped with rudimentary humidity control. It contains books, paperwork, records and the curator's office. The latter consists of a third-hand metal desk and a plywood shelf holding one of the facility's three networked PCs. The most recent (just two years old) addition has full HVAC.

Without further ado, let's take a tour through this fascinating place, meet some of the volunteers who staff it,and find out a bit about the work they do to make your museum possible.



Right, from the top down: 1. *Mike Csontos, the museum's "audio guy" repairs the speed regulator on our newly acquired Victrola. 2. In the telegraph room Art DeBruycker, W2YGW, works on a Morse Register being loaned to the San Francisco Maritime Museum for a special display. 3. Shelly Kane, KA2HSU (left), and Harvey Cohen, K2EJP, sort and organize a bit of the museum's parts collection. The long-term goal is to have all parts identified and stored so that they can be made available to members needing them for restorations or replica building. 4. Even the bulkiest donation can be slipped into the Annex through the large overhead door. This big Victrola VV260 obviously poses no problem at all!*

AWA ANNUAL CONFERENCE

THRUWAY MARRIOTT, ROCHESTER, NY
SEPTEMBER 1-4, 1999

WELCOME BACK! At the 38th annual conference, collectors and history enthusiasts will convene, exchange equipment, and learn more about the development of radio and electronics. If you have never been to the yearly "reunion," why not give it a try ? Rochester (Henrietta) is just north of upstate New York's beautiful Finger Lakes region, easily reached by car or plane. The site is 26 easy miles from the AWA Museum at Bloomfield.

Advance registration is encouraged. This will allow you to receive your conference packet with a minimum of delay, with preassignment of flea market spaces. Preregistration, using the enclosed card, can be made through Richard Ransley, Box 41, Sodus, NY 14551 before Aug. 25. Unlimited registration at the door.

The Thruway Marriott is a full-sized, full-service hotel. It offers special nightly rates ($92 single, $94 double, $94 triple, $94 quad) up to Aug. 24. For info or reservations, call (716) 381-8230 or (716) 389-8300. The Marriott has high-quality restaurant facilities, and other lodging and eating places are nearby.

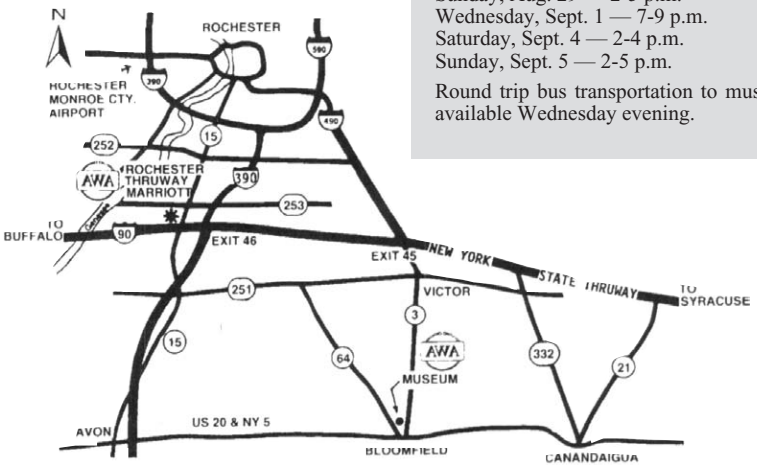
The hotel is reached from Exit 46 of the New York State Thruway (1-90): take I-390 north to NY 253 west, to NY 15 south. For visitors arriving by air, the location is about seven miles or 15 minutes from the airport. There is shuttle service, 7a.m.-11p.m. (specify the Thruway Marriott).

The special theme for this year is "Philco."

Conference Chairperson
BRUCE ROLOSON

Program Chairperson
LAUREN PECKHAM

Contest Chairperson
GEOFFREY BOURNE



AWA ELECTRONIC COMMUNICATIONS MUSEUM

VILLAGE GREEN, BLOOMFIELD, NY

Refer to map at left. Directions from hotel: Right (south) on Rt. 15. At Avon (9.5 mi.), left (east) on Rts. 5 & 20. At Bloomfield (16 mi.), left at brown "Radio Museum" sign near Holloway House restaurant. Go approx. 200 ft. and park. Museum is on the left.

HOURS:
Sunday, Aug. 29 — 2-5 p.m.
Wednesday, Sept. 1 — 7-9 p.m.
Saturday, Sept. 4 — 2-4 p.m.
Sunday, Sept. 5 — 2-5 p.m.

Round trip bus transportation to museum available Wednesday evening.

AWA Conference Agenda

WEDNESDAY (9-1-99)

6 a.m.—**Flea Market** opens (through 11 a.m. Saturday). Food service will be available on-site.(Wed. to Fri.)

6:50 a.m.— **Sunrise**

8 a.m.-5 p.m.— **Registration** for Conference—Assembly Corridor

8 a.m.-5 p.m.— **Book Fair**—Pre-assembly Court

11:00 a.m.-noon — **AWA Membership meeting**. Be ready with questions, discussion topics, suggestions, regarding the operation/mission of our club. Conducted by AWA President *Bill Fizette*—Seneca Onondaga Room..

1 p.m. — **Philco and the Miss America Pageant.** *John Okolowicz* will provide a nostalgic trip back to the late 1950s—Seneca-Onondaga Rooms..

2:30 p.m. — **Shortwave History, Part 4, Radio in the Military to December 6, 1941.** Researched by *Bart Lee*—Seneca-Onondaga Rooms.

4:00 p.m. — **Key & Telegraph Seminar.** With new moderator *Tom Perera, W1TP*—Seneca-Onondaga Rooms.

7-9 p.m. — **AWA Museum and Annex Open.** Bus leaves hotel at 6:30 p.m. (Meet in front lobby.) Round trip bus fare, $12.00.

7:30 p.m. — **Philco—Those Beautiful Hand-Painted Radios** by *Michael Prosise*—Seneca-Onondaga Rooms.

THURSDAY (9-2-99)

8-9 a.m. — **Check-In** of equipment for Communications Equipment Auction—Cayuga-Mohawk Rooms.

8 a.m.-5 p.m. — **Book Fair**—Pre-assembly Court.

8 a.m.-Noon — **Registration**—Assembly Corridor.

9 a.m. — **Communication Equipment Auction.** *Col. Ed Gable*, K2MP, auctioneer. Post-1930 communications equipment, such as receivers and transmitters by National, Hallicrafters, or Hammarlund. No bidding card needed; sales are seller-to-buyer. ***No Items Containing Mercury!!***—Cayuga-Mohawk Rooms

10:30 a.m. — **The Amateur Radio Station That Time Forgot**. *Lou Leonard*, WA2UIJ, tells of the discovery of a late 1920s station locked away in an attic!—Seneca-Onondaga Rooms.

Noon — **Ladies Lunch**—includes interesting program—Salon A.

1-5 p.m. — **Registration**—Assembly Corridor.

1:00 p.m. — **Philco—A History of the Company and Home Radios** by *Ron Ramirez*—Seneca-Onondaga Rooms.

3:00 p.m. — **Vacuum Tube Seminar** presented by The Tube Collectors Association, conducted by *Jim Cross, Al Jones* and *Ludwell Sibley*—Seneca-Onondaga Rooms.

4-6:30 p.m. — **Main Auction** check-in, bidder registration, and preview. Registration and bidding card are good for all auctions. Registration fee of $3.00 credited toward any purchase. ***No Items Containing Mercury!!***—Seneca-Onondaga Rooms.

7-10 p.m. — **Old Equipment Contest**—check-in of entries—Henrietta Ballroom (Salons A, B and C). This is the time to bring in displays.

8:00 p.m. — Vacuum Tube Auction (new time this year.) Successful bidders must pick up tubes at conclusion of auction—Seneca-Onondaga Rooms—Auctioneer, Bruce Roloson.

FRIDAY (9-3-99)

8 a.m. — **Auction Preview** (bidder registration and preview only)—Seneca-Onondaga Rooms.

8 a.m.-5 p.m. — **Book Fair**—Pre-assembly Court

8-11 a.m. — **Equipment Contest Judging** — Salon A & B.

8 a.m.-noon — **Registration**—Assembly Corridor.

9 a.m. — **Paper Collectibles Auction**—Iroquois Ballroom—Auctioneer, Walt Buffinton

10:00 a.m. (±) — **General Auction**, continuing from paper-collectibles; includes gear donated to support Museum maintenance. Auctioneer, Walt Buffinton

11 a.m.-noon — **Equipment Contest Entries** open for viewing — Salon A , B & C.

1-4:30 p.m. — **General Auction** continues.

1-5 p.m. — **Equipment Contest Entries Viewing** continue — Salon A, B & C.

1-5 p.m. — **Registration** — Assembly Corridor.

3:30 p.m. — **Review OT Amateur Operation.** With *Mike, W2ZE* and *Bob, W2ZM*. A fun time for all hams and a chance to discuss various activities — Salon D.

7 p.m. — **Historical and Top Awards Banquet.** Cash bar available. Various AWA awards will be presented.

9-11 p.m. — **Equipment Contest Viewing** continues — Salon A & B.

9-10 p.m. — **Auction Payment** — Registration Area.

11 p.m.-midnight — **Equipment Contest Pickup**.

SATURDAY (9-4-99)

8 a.m. — **Book Fair**—Pre-assembly Court.

8 a.m. — **Equipment Contest Pickup**.

9 a.m. — **The Skywave High-Performance Crystal Set.** *Al Klase* tells how to build one that will amaze you—Seneca-Onondaga rooms.

10:30 a.m. — **Pre-1912 Wireless and Electrical Apparatus Display.** Moderated by Lauren Peckham. Members are encouraged to bring items and provide brief descriptions—Seneca-Onondaga Rooms

Noon — **Finale Luncheon** — Luncheon with Contest Awards and Closing of the 38th Conference — Salon A & B.

2-4 p.m. — AWA Museum open

SUNDAY (9-5-99)

2-5 p.m. — AWA Museum open

FLEA MARKET POLICIES

Following are the policies that will be in effect for the 1999 flea market.

First, the market will run only in conjunction with the conference dates, from Wednesday morning to Saturday afternoon. *No* flea market sales will take place at the hotel parking lot prior to Wednesday. The flea market area will be sealed off, unavailable to anyone until the gate opens at 6 a.m. Wednesday. The prohibition of non-conference flea marketing is a matter of hotel rules and our Special Use Permit required by the Town of Henrietta. **NO ITEMS CONTAINING MERCURY!!**

Second, there will be only one class of site. All sites are treated the same and are issued randomly on a first-come, first-sold basis. Each member may pre-register for one or two sites, at $20 for the first and $35 for the second. Two sites to one member will always be adjoining. Pre-registration is highly recommended to assure a pre-assigned, numbered spot on the paved area. Everyone wanting to participate will get a spot. However, the paved-area, pre-numbered spots will probably sell out during the preregistration period. At that point we will start assigning spots on the grass on the Thruway side of the parking lot.

Third, flea market headquarters will be located at the entrance to the market. Look for the big banner. This will be a full-service area where one can pay registration fees and sign up as a flea market seller. Only AWA members may participate. **Everyone needs to register for the conference—-the flea market is only a portion of overall conference activities. A non member wishing to sell in the flea market is welcome to join, paying $15 dues, $20 conference registration, $20 for the first site and $35 for the second site. (Site assignments dependent on availability.)**

Membership may not be purchased at flea market headquarters. Go to the registration area inside the hotel.

RULES AND CONDITIONS

EVENTS: Admittance to any activity, flea market included, requires a registration badge.

FLEA MARKET: Opens 6 a.m. on Wednesday. **NO ITEMS CONTAINING MERCURY**. Nev York State sales tax forms will be available. AWA not responsible for sales or tax. Neither AWA nor the Marriott is responsible for the security of personal property in the flea market area. We are asked to confine market activity to the designated area to avoid the NY State Thruway right-of-way. KOA and other camp grounds are available in the vicinity. No overnight sleeping in the flea market area.

NOTICE: No formal sightseeing tour is scheduled this year.

1999 ANNUAL CONFERENCE — EASY REFERENCE

	WEDNESDAY SEPT. 1	THURSDAY SEPT. 2	FRIDAY SEPT. 3	SATURDAY SEPT. 4
6 a.m.	Flea market opens			
8 a.m.	Registration; Book Fair	Registration; Book Fair; Check in For Communication Equipment Auction	Registration; Book Fair; Auction Preview; Contest Judging	Book Fair Equipment Contest Pickup
9 a.m.		Communication Equipment Auction	Paper Collectibles Auction	Skywave Hi-Performance Xtal Set
10 a.m.			General Auction	
10:30 a.m.		Amateur Station That Time Forgot		Pre-1912 Wireless and Electrical Apparatus Display
11 a.m.	Membership Meeting		Equipment Contest Viewing	
Noon		Ladies Lunch	Auction Stop	Finale Luncheon
1 p.m.	Philco and the Miss America Pageant	Registration; Philco: History of the Co. and Home Radios	General Auction Contest Viewing Continue	
2:00 p.m.				Museum open 2-4 p.m.
2:30 p.m.	Shortwave History			
3 p.m.		Vacuum Tube Seminar		
3:30 p.m			Amateur Radio Topics	
4:00 p.m.	Key and Telegraph	Check-In For Main Auction (thru 6:30 p.m.)		
6:30 p.m.	Bus to Museum			
7 p.m.	Museum and Annex open until 9 p.m.	Check-In for Old Equipment Contest (thru 10 p.m.)	Annual Historical Banquet	
7:30 p.m.	Philco—Those Beautiful Hand-Painted Radios			
8:00 p.m.		Vacuum Tube Auction		
9 p.m.			Equipment Contest; Auction Payment	
11 p.m.			Equipment Contest Pickup	

THE OLD EQUIPMENT CONTEST – 1999 AWA CONFERENCE

The Philco Corporation

By Geoffrey Bourne and Ralph Williams, N3VT

The AWA Old Equipment Categories for the 1999 contest are divided into two major groups; Theme and Standard. The Theme categories reflect the Conference's central historical purpose: a review of the products and history of The Philco Corporation.

This year we will continue with the Standard categories: Receiver, Transmitter and Craftsman; The receiver categories will be delineated by the number of tubes in the entered receiver. Every year we have two Transmitter categories; Spark and CW so we will have them again in 1999. The Craftsman categories fulfill a strong membership interest by offering opportunities to our members to show their special skills in conservation and restoration. Added this year to the Standard categories is a new category: Tubes.

THE THEME CATEGORIES

1. The Early Years
When Philco first entered the radio market it was not with a radio set. The company was supplying storage batteries and A-B Eliminators. So bring in an old Socket-power unit or an old storage battery.

2. The Late 1920s
In the late 1920s. the AC powered radio was introduced. Philco had to switch strategies from battery manufacturing to radio manufacturing in order to stay in business. They quickly became one of the largest makers of radios in the United States. So bring in a nice example of one of the color Radios or a highboy.

3. The 1930s
In the 1930s the country was in the middle of the great depression. Money was tight and radio was becoming very popular. To maintain market share, Philco brought out a line of low cost receivers. A good example was the "cathedral" radio line. This would be the category to display a model 90 or a nice tombstone. Another example would be one of the interesting floor models.

4. The 1940s
During the early 1940s people wanted more from their radios. The quality of the sound coming out of the speaker was important. The radio manufacturer made great strides to improve quality. So bring in an example of a pre-war or post war set.

5. Test Equipment
Philco, like most manufacturers, had their own line of test equipment for service technicians. They made tube testers, audio oscillators. RF generators, meters, oscilloscopes and many other pieces of test gear. So bring in a collection or just one piece. Maybe even show how it was used. Be imaginative. Philco also trained the service personnel with educational test panels, many of which were used by the military and, later, by the Vocational schools. Not too many of these sets still exist.

6. Television 1940-1960
Black and White
In 1948 Philco brought out its first television, and continued producing sets for many years. One of the most famous of these was the Predicta. Bring in a fine example of a Philco TV.

7. Company History
In this category we are looking for company information, sales quotes, engineering documents, technical information bulletins or other documents to add life to our picture of the company.

8. Advertising and Customer Documents
In this category we are looking for customer-oriented documentary artifacts. Magazine ads, dealer displays, give-aways, descriptions of radio or television programs, and customer instruction books are examples of possible entries in this category.

THE STANDARD RECEIVER CATEGORIES

9. Passive Receivers.
Any detecting device, not including vacuum tubes or solid state amplifying devices, whose purpose is to convert radio energy into intelligent signals.

10. One- and Two-Tube Receivers
Any receiver which uses one or two tubes for any of its functions. A tube or valve that includes more than one electron stream in a single envelope will be counted as one tube.

11. Three-Tube Receivers
The detector-two-stage radio is the most often found example in this category, but reflexes and special circuit sets are sought.

12. Four- and Five-Tube Receivers
Many radios from all periods can fit here, not just three-dialers. Electric radios that show some special feature will be welcomed.

13. Receivers with Six or More Tubes
Superhets are the usual entries in this class but many other sets qualify, especially the electric radios of the thirties. Most communication receivers can be entered.

14. Novelty Radios
Entries here can range from Mother's Oats crystal sets to Teddy-bear transistors, leavened with goodly doses of the All-American Five.

15. Speakers
A. HORN. Any sound reproduction device can be entered here as long as it employs a horn or bell for sound amplification.
B. CONE. When radio sets obtained greater power output levels, the magnetic speaker unit was designed with large surface areas for better sound reproduction. There are many fine examples of this type of speaker, i.e. Tower Adventurer, Western Electric, etc.

16. Test Equipment
This is a new category for the contest; many people have asked for it. There were many makers of test gear. A short list would include Supreme, Superior, Hickok, Weston, Read-Rite, General Radio, Simpson, Rider, RCA, and too many others to list.
So surprise us! Bring in the unusual or the common.

THE TRANSMITTER CATEGORIES

17. Spark Transmitters and Artifacts
Do not hesitate to enter a major piece of spark equipment if you think it is rare or historically significant.

18. Vacuum Tube Transmitters
Some of the sets for this class are old, some not so old, most home-built. While the predominant entries have been amateur-operated, commercial equipment is welcome.

THE CRAFTSMAN CATEGORIES

19. Restoration of Appearance
The purpose of this category is to display examples of rebuilding and refinishing the cabinets and containers that were used to house radio receivers. There is no requirement for a particular kind or size of set to be entered. A description of the work done will be considered an important part of the entry. The critical element is the appearance of the radio, including woodwork, escutcheons, dials, knobs and other visual details.

20. Restoration of Operation
This is the category for those craftsmen who artfully substitute modern components for old failures. The new electrolytic in the old can is an excellent example. Another is the transistorized tube. Perhaps the replacement of pot-metal parts by silver-gray-colored epoxy castings has been accomplished by one of us. If so, please bring in the set incorporating that restoration. An entry should be accompanied by documentation showing the basis of the update that preserves the quality of the original.

21. New or Rebuilt
Previously we have encouraged entries that showed the conference attendees how substitutions and reconstructions would provide vital parts or pieces. We also encouraged craftsmen who had made an old function come alive again to bring their work for review. Do you remember the Federal receiver that was entered several years ago and the operating Marconi coherer detector from a few years ago? We want to continue that tradition, so bring in your retrospective designs and your reconstructions. There is no requirement for particular devices or circuits.

THE TUBES CATEGORY

22. We'll start with something simple this year. In this category you can display a single tube or a collection. Collections should have a common theme such as historical significance, technological breakthroughs, etc. The display should tell a story.

THE CONTEST AWARDS

Elle Craftsman. Given in memory of Bruce Elle to a builder of a high-quality radio receiver of an old or new type.

Matlack Transmitter.Given for excellence in constructing or restoring transmitting equipment.

Display. Recognizes the informational value and quality of an exhibit in the contest at the AWA conference.

Thompson Best of Show. Awarded in honor of early amateur Eunice Thompson, W1MPP, for the top entry in the Old Equipment Contest at the Annual Conference.

People's Choice. Awarded to the entry that receives the most favorable votes from attendees and visitors to the contest. All entries, including displays, are eligible for this award.

EDITED BY **ROGER W. REINKE**, 5301 NEVILLE CT., ALEXANDRIA, VA 22310-1113
PLEASE INCLUDE SASE FOR REPLY.

George M. Phelps—Instrument Maker
(Conclusion)

By John Casale, W2NI

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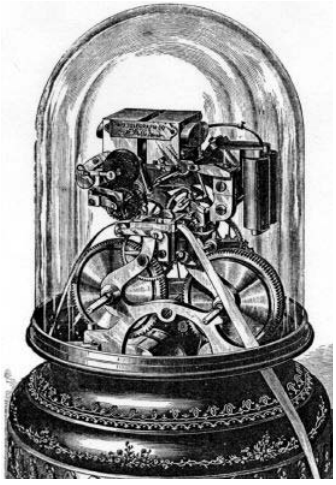
Part 1 of John Casale's article on master telegraph instrument maker George M. Phelps appeared in the last issue of the OTB. *It covered Phelps' early career from the time he set up shop as a machinist in 1850 through Western Union's acquisition of the American Telegraph Company, where Phelps had become superintendent, in 1866. This second and final installment covers the inventor's Western Union career through his retirement from the firm in 1884.*

Phelps' role at Western Union required him to work on any technology, new or old, that would ensure the company's dominance in the industry. Phelps' design of a stock ticker in 1870 allowed Western Union to force a merger with the Gold and Stock Telegraph Company. Gold and Stock, which was the only Company transmitting market information from the New York Stock Exchange, had negotiated with Thomas Edison for the production of his Universal Private Line Printer. But the Edison printer only had moderate success. Western Union was able to force the merger in 1871 by threatening to enter the New York market with the new and faster Phelps equipment. The original Phelps stock ticker became the Western Union "Financial Instrument."

In 1875 Phelps introduced the last in the series of large fast-printing telegraph machines designed for use on major lines. Drawing upon his experience with the House, Hughes, and Combination printers (see Part 1 of this article), Phelps' new design was noted as his most significant achievement in printing telegraph instruments.



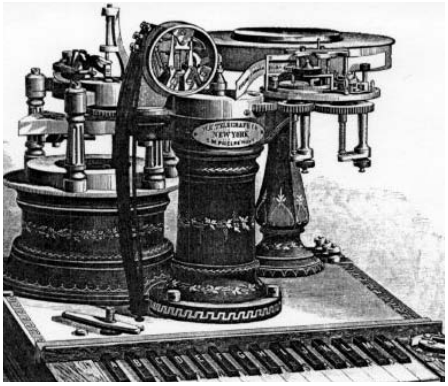
The Phelps stock ticker.

The Phelps Electro-Motor Telegraph, as it was called, was ten years in development. Based on the inventor's new "electro-motor/governor arrangement," the device was able to achieve speeds of up to 60 wpm. It was designed for hard commercial use and was found only on important high traffic circuits. It could operate at full speed on the route from New York to Chicago without a repeater.

This printer was on display at the U.S. Centennial Exhibition in Philadelphia in 1876. Judged by scientists of the calibre of Sir William Thompson and Joseph Henry, it received the highest award for "Excellence and Superiority." James D. Reid, another respected telegraph authority in the 19th century stated "[it] may be regarded as a specimen of the highest efforts of the human intellect."

During this same period Phelps was also involved with significant developments in conventional Morse systems. In early 1872, Western Union adopted Joseph Stearn's patents for duplex telegraphy. This prompted Thomas Edison to approach Western Union's president William Orton about possible interest in other systems. Western Union, concerned about controlling this technology, arranged with Edison to come up with possible competing designs.

Alternative duplex equipment designs by Edison were given to Phelps to be built for experimentation. In 1874 Western Union and Edison



The Phelps Electro-Motor Telegraph

came to an initial agreement on Edison's new Quadraplex system. Quadraplex would allow four simultaneous transmissions on a single conductor and would save Western Union considerable money. Edison initial specifications for equipment to be constructed by Phelps included:

- 6 small relays
- 6 single sending sounders
- 6 reversing sounders
- 6 differential polarized relays
- 24 Keys
- 6 Switches
- 6 Bridge rheostats

It is interesting to note how Edison incorporated existing Phelps components into the new system. His specifications include language such as "using ordinary Phelps sounders" or "using ordinary Phelps binding posts." Edison also hand drew a sketch of a modified Phelps sounder. We can probably assume that a mutual respect existed between the two men. Phelps at this time was 54, Edison was 27. On one internal correspondence memo, Edison makes reference of Phelps as "Mr. P."

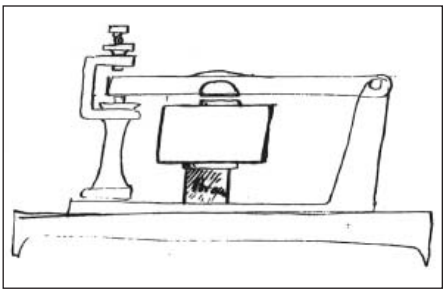
The Quadraplex experiments were eventually a success and quickly utilized by Western Union. Major litigation took place for the patent rights, but by 1877 Edison and Western Union came to an agreement. At this time, Edison also agreed to give Western Union sole U.S. rights for all inventions that could be used on telegraph land lines.

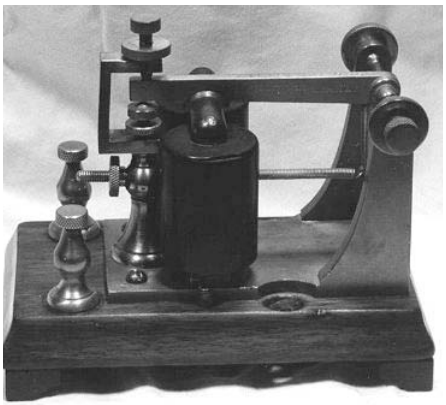
This involved Phelps in building more of Edison's experimental/patent models. The first one following this agreement was Edison's Sextuplex, a system using a combination of his Quadraplex and acoustic techniques to achieve six simultaneous transmissions on a line.

The arrangement with Edison would continue right into the telephone era and Phelps would build some of Edison's early telephone patent models also. Phelps also invented and patented some early receiver and transmitter designs of his own. Western Union was in defiance of Bell's patents early, selling receivers designed by Elisha Gray and Phelps, and transmitters by Edison and Phelps. Their New York factory, run by Phelps, would build both telegraph and telephone apparatus from 1877 through 1879.

In the late 1870s two million area New Yorkers had the ability to set their timepieces to an event that happened daily at noon. High atop Western Union's building in New York City a ball would drop precisely at noon triggered via telegraph by a operator at the National Observatory in Washington. This system, including the ball and discharging apparatus, was designed and built by George Phelps.

1879 would be a transitional year for Phelps. Western Union's management decided to get out of the manufacturing business and sold its New





Edison sketched a modification (left) of the standard Phelps sounder (right) as part of the specifications for the Quadraplex system. (Edison Sounder drawing with permission of Thomas A. Edison Papers, Rutgers University.)

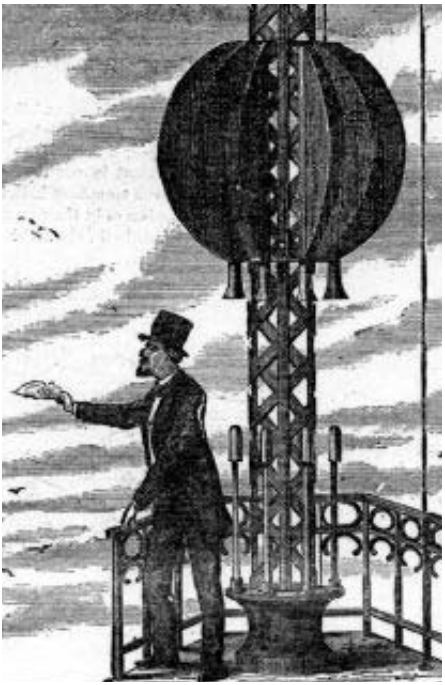
York factory to the Western Electric Manufacturing Company. After this time, Phelps would no longer manufacture instruments for Western Union. He would stay on as the company's only inventor, conducting experiments and evaluations until his retirement.

It is important to note that the Phelps name continued to be associated with the manufacture of telegraph instruments after 1879. The inventor's son, George M. Phelps., Jr., became the new Superintendent of the Western Electric factory. George Jr. had previously worked as his father's assistant at Western Union and prior to that as a bookkeeper at American Telegraph. He, too, would be widely recognized in the Telegraph industry, and later would became a co-editor of *The Electrical Engineer* with Franklin Pope.

All of Phelps' instruments made throughout his career were of the highest quality. There was no such thing as a low-end Phelps instrument. He set the quality standards not only by design but by the authority of his position with Western Union. Many of his Morse instruments were Western Union "standards" or "approved" models. This might explain why other makers built look-alike models. In this writer's opinion, the Phelps classic camelback key was simply a result of the inventor's artistic and functional creativity being applied to an old design.

Along with his eloquent lever treatment, Phelps relocated and modified the spring tension adjustment previously found on the camelback designed by a Mr.Chubbuck of Utica, N.Y.. He moved this adjustment to a central point on the lever, a decision that would influence future key makers for decades. Most subsequent key designs for landline and radio work followed this plan. Consider this insight by Franklin Pope: "The standard American Morse relay of the present day (l888) is another simple but eminently characteristic example of his (Phelps') skill in the adaptation of novel, convenient and tasteful designs to old devices".

A lot has been said about his accomplishments, but what about the man? From the small amount of information that has been documented about him, George Phelps was a quite genial person. He was thoughtful and reserved in manner with a strong sense of humor. He was an accomplished musician who enjoyed playing the organ at church. Western Union's president, William Orton, was his friend as well as his boss. Phelps was confident and capable in teaching an employee any role required in his factory.

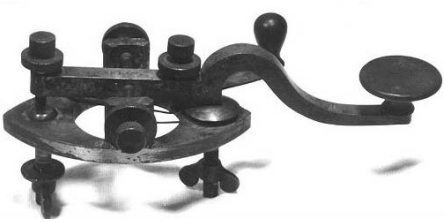


The Western Union "Time Ball."

In 1881 the inventor suffered a stroke affecting one of his hands. His health forced him to retire from Western Union in 1884. Franklin Pope best describes Phelps work ethic: "To him difficulty presented itself merely as a thing to be attacked and overcome. To yield to it was apparently the last thing to enter his mind."

Those who own Phelps instruments should take special care in preserving them. Consider the example of Lou Moreau, who left her Phelps, along with the rest of her collection, to the Antique Wireless Association Museum. Making such a bequest will ensure the permanent care of your priceless piece and give future generations the opportunity to admire examples of some of the finest telegraph instruments produced in this country.

For a bibliography of reference material used in developing this article, send a long SASE to John Casale, 3 Pickering Lane, Troy, NY 12180.



The Phelps "Camelback" key.

BY ROBERT M. MORRIS, 2CQZ/W2LV
SILENT KEY, OCTOBER 15, 1997

ESTABLISHMENT OF THE RADIO MONITORING STATION AT VINT HILL FARMS

The February, 1998 issue of the OTB which, by sad coincidence, was also the Bruce L. Kelly Memorial Edition, reported the passing of Robert Morris, W2LV. One of the original AWA founders, Bob was also co-founder and original editor of the AWA Review. Several months ago, Bud Hall, K2LP sent the manuscript for this article to the OTB*, explaining that he had obtained permission from Dorothy Morris, Bud's widow, to have it published by the Antique Wireless Association.*

The manuscript existed only as a faint dot matrix printer copy, so Bud and Henry Fales, KZ1V, took it upon themselves to word process a new copy and put it on a floppy disk. It has taken awhile to reach the top of the manuscript pile here at the OTB*, partly because it is a very long article with no illustrations.*

However, it is a fascinating story of how a prominent NBC radio engineer, now serving as Chief Engineer for the Signal Intelligence Services Monitoring Service, found himself with the job of setting up a new permanent radio monitoring station during the early months of World War II.

Shortly before the outbreak of war on 7 December 1941, the Signal Corps, under the Office of the Chief Signal Officer, established at Fort Monmouth a small radio monitoring station for the purpose of intercepting radio communications which might be of interest and value to the Signal Intelligence Service of the Signal Corps. This work was conducted by a small detachment of the Second Signal Service Battalion, perhaps 20 officers and men. The group would establish operating standards and practices, equipment needs, and personnel training for a service which would be essential should the United States be drawn into war. Similar small detachments and monitoring points were established at The Presidio, at Fort Schafter and at Ladd Field Alaska. Intercept material was forwarded usually by mail to the Signal Intelligence Services (SPSIS) in Washington.

Things changed radically and abruptly with the attack on Pearl Harbor. It was immediately evident that the Signal Intelligence Service must become vastly more active and that radio intercept facilities must be greatly enlarged in size and function. The latter responsibility fell upon Colonel Bullock and his assistant Major Schukraft.

In January 1941, I had been asked by NBC Vice President of Radio Recording, LLoyd Egner, to take a job as Business Manager of the Radio Recording Division, second in charge of the Division. This meant leaving my work as head of Engineering Development. After serious consideration, I decided that I had better accept the offer. The work was quite different and had little to do with radio engineering.

When war came in December of that year I considered that perhaps my long time engineering experience should be made available to the war effort. I informed Dr. Jollife of RCA, who had many Washington contacts, of my feelings. It was not long before the Office of the Chief Signal Officer came to RCA looking for a Chief Radio Engineer for the SPSIS Monitoring Service. I was asked to go to Washington to see Major Schukraft regarding this job. It became evident that he would like to have me help establish better monitoring stations, and that I was qualified for the job. I agreed to take it. I left NBC for Washington and the Signal Corps approximately June 20.

I found a place to stay in a rooming house on "O" Street near DuPont Circle and reported to the SPSIS in the Munitions Building. My mother had worked in the same building in 1918.

In the period between the attack on Pearl Har-

PUBLISHED BY PERMISSION OF MRS. DOROTHY MORRIS

bor and June 1942, there had been much activity leading to the development of the radio monitoring service. The Second Signal Detachment at Fort Monmouth had been moved to Fort Hunt on the Potomac below Washington in order to be closer to headquarters in the Munitions Building. Action had also been taken to acquire a large radio quiet location for a permanent monitoring station. This had just been accomplished and the Fort Hunt Detachment had just moved when I arrived in June.

The location was, of course, Vint Hill farms just east of Warrenton, Virginia. Major Schukraft and I visited Vint Hill the day after I arrived. Cows and other farm stock were still in evidence. The Second Signal personnel under Lt. Pope were set up for operation in, and also quartered in, the main building (the residence) of the farm.

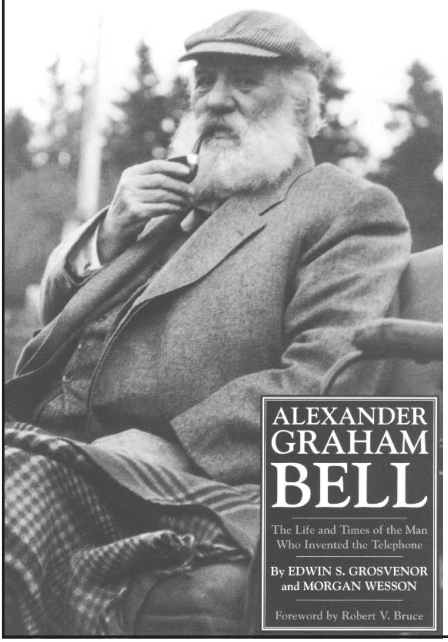
In addition to the main building there were a few smaller buildings of dubious value and a large barn which it was believed would be modified by the Corps of Engineers and an architect

ALEXANDER GRAHAM BELL

A Book You'll Want to Own!

An important new illustrated biography of Alexander Graham Bell has just been released to coincide with the 150th anniversary of the inventor's birth. *Alexander Graham Bell* was written by AWA member Morgan Wesson in collaboration with Edwin S. Grosvenor, Bell's great-grandson.

The book chronicles the inventor's upbringing in Scotland, the family's emigration to Canada, and the young man's career as a teacher of the deaf in the Northeastern U.S. It follows this innovative man as, spurred by twin interests in acoustics and telegraphy, he begins to experiment with electrical communication.


ALEXANDER
GRAHAM
BELL
The Life and Times of the Man Who Invented the Telephone
By EDWIN S. GROSVENOR and MORGAN WESSON
Foreword by Robert V. Bruce

The dramatic story of the development of the telephone unfolds, and the work of competing inventors, including Thomas Edison and Elisha Gray, is put into perspective. Also discussed is Bell's later inventing career and his involvement with aviation, hydrofoils and the founding of the *National Geographic*.

The 8¾"×1¼" handsomely-printed hardbound book contains 304 pages. Its 400 illustrations include many published for the first time.

Emmy-award-nominated author Wesson is probably best known to *OTB* readers for his work, with Ken Burns, on the video documentary *Empire of the Air*. He has also written on the history of technology for *Encyclopaedia Britannica* and *Groliers* and served as a curator at The International Museum of Photography at George Eastman House.

Special Pricing For AWA Members

Through a special arrangement with the author, members can purchase this important illustrated biography directly from the AWA for $37.95 (plus a $2.05 shipping and handling charge), which is over seven dollars off the bookstore price of $45.00. A special edition, signed by the authors, is available for $47.95 (plus $2.05 s&h). Not only will you receive this outstanding work at a significant discount, but the AWA will also receive a cash contribution for each volume sold. What's more, for this contribution, you may take a tax deduction of $17.50 (basic book) or $27.50 (special edition).

So what are you waiting for! Send $40.00 for the basic book or $50.00 for the special edition to: Stanley J. Avery, Antique Wireless Association, 5900 Moran Rd., Canandaigua, NY 14424.

to serve as an operations central. It was also evident that substantially better antennas than the small multiple dipoles then in use would have to be provided. Plans of the new property (occupying approximately 200 acres) were obtained and work on modifications and layout was started.

In addition to OCSIGO which had standard specifications for a variety of rhombic antennas on file, the best source of information on high-frequency high-gain antennas I know of was RCA communications at Riverhead, Long Island. Accordingly, I made arrangements to visit Riverhead to visit Harold Beverage and others to discuss our antenna problems and get their recommendations.

The Riverhead receiving station used principally an antenna designed by that group called the "Fishbone Antenna." It allegedly had excellent directional characteristics and was relatively free of unwanted noise. It was, however, quite complicated in design and construction. It was agreed that while these antennas were excellent, rhombic antennas would be more practical and appropriate and much easier and faster to install. I decided to recommend four Fishbones aimed at Europe, one of our principal areas of interest, and to install in the remainder of the antenna field, rhombic antennas covering all directions. Because of a critical copper shortage, I adopted the four wire, 200 ohm transmission line developed and used by RCA at Riverhead to get signals back from the antennas to the operations center. This line was extremely efficient and free of noise and required four copper-clad steel number 14 wires supported by special insulators of which Riverhead had a goodly stock that would be available to us until we could have more manufactured. I was able to obtain from Riverhead complete design and construction details and specifications for the Fishbone Antennas and four wire transmission lines.

We planned to use a new plastic-covered coaxial transmission line (similar to RG-8/U) from the four wire transmission line terminals to the distribution racks, and from there through or under floor-ducts to the many receivers. This required the use of a Western Electric RF impedance matching transformer to interface between the 200 ohm lines and the 50 ohm coaxial cables. Many of these problems were dealt with using video techniques developed in the RCA/NBC television field test with which I was fully familiar. Western Electric coaxial plugs and jacks, for example, were a very convenient means of connecting and switching antennas to various receivers.

Vint Hill was initially provided with power by a small (I believe it was 3000 kw) REA power system located in Manassas. It was evident that this system would soon be overloaded so arrangements were made to have power supplied by Virginia Power and Light. Barracks, sanitary facilities, necessary roads and such were supplied by the Corps of Engineers. By September, much of this work along with modifications to the barn and erection of new antennas was sufficiently advanced to provide rapidly increasing service from Vint Hill, Station 1.

A problem of course was the acquisition of trained and qualified personnel. The Chief Operator of the Second Signal Detachment was Master Sergeant Balyck. He was one of the most skilled radio operators I have ever known. I have personally seen him copy messages in five letter code groups at 30 words per minute while carrying on a conversation. Such versatility I have never been able to comprehend.

Sergeant Balyck was fully in accord with the need for more operating staff, but quite pessimistic about the short term effects of the augmentation. He felt that additional operators in need of training would reduce the time available for monitoring by the skilled operators. In this, he was undoubtedly correct. But since augmentation of staff was necessary, it was done.

A principal source of new operators was the Amateur Radio Service. Amateur operators were acquired whenever possible. Shortly after we had moved from the Munitions Building to Arlington Hall, I encountered a young sentry with a Tommy Gun slung over his shoulder and we struck up a conversation. It soon developed that he was a licensed radio amateur and would like to be involved in radio work. I noted his name and call letters and went directly to the office of the Second Signal Battalion Adjutant. I gave him the sentry's name and said we wanted him at Vint Hill. The young former sentry was wearing headphones the next day. I hope they changed his MOS!

Another source of help with the personnel problem at Vint Hill was a detachment of WAACS who could type. It was found that they could be trained to read Morse code from Boehme tape easier and faster than by the usual method of aural reception. Accordingly, operating positions were set up with typewriters and Boehme tape equipment. This soon made possible the direct monitoring of high speed circuits that would have been difficult to handle otherwise. It was not long before I saw some of these WAACS typing at 80 words per minute from tape streaming across their work stations. The WAAC staff was also very helpful in putting message traffic on the teletype circuits to Arlington Hall.

It was eventually arranged for me to get back to New Jersey for a weekend every two weeks. On one of these trips on the B&O Railway, I encountered a friend of mine, Captain Everett Seider, W2AHN, who had been called to service in Washington but was without meaningful assignment. I suggested he could be used at once in what I thought he would find interesting work and suggested he apply for transfer. He very shortly appeared at SPSIS and was assigned to Vint Hill. He became quite active in developing what came to be known as the non-Morse operation.

Shortly after the beginning of 1943, I saw in our New Jersey paper that another friend of mine, Richard Bluhm, W2KXD, had been inducted into service and was then at Fort Dix. Again I visited the Battalion Adjutant and said we would like Bluhm in 2nd Signal. The next day Richard said he was awakened by the top sergeant at 4 AM and was told, "Bluhm get up. You are going to Second Signal Service Battalion in Arlington." Richard said later when he saw me "Morris, I could see your face just as plain."

We were also fortunate in being able to obtain the services of officers from the Bell System skilled in many aspects of modern communication. Captain Colson, who was skilled in outside plant construction, was of great help in directing the building and installation of the large antennas at Vint Hill. Captain Simonich, a former dis-

AWA Review Volume 11 Now Available

Continuing the tradition established by its ten predecessors, Volume 11 of *The AWA Review* presents four major historical papers in the field of wireless and radio communication.

The story of the E.H. Scott Radio Laboratories is one of the highlights of the golden age of the American radio industry. It was written by Kent King, one of the founders of the E. H. Scott Historical Society and editor of the Society newsletter. Kent's comprehensive and profusely illustrated paper traces the emergence of the company in the early days of radio, through its most productive years, to its eventual demise. The contributions of founder E. H. Scott to the technology of his products are reviewed, and collectors of these fine and highly sought-after sets will find a wealth of material to guide their searches. The author also discusses those Scott receivers which are still eluding collectors.

Dirk Vermenlen tells of **the beginnings of vacuum tube radio at The Western Electric Company**. Using source material from A.T. and T. archives, he discusses the evolution of the equipment from early experiments through the development of practical technology. His story is peopled with some of the most famous names in radio history. Illustrations include photos of World-War-I-era naval and aeronautical radio gear highly sought after by today's collectors.

A little-known aspect of the development of wireless telephone in the Pacific was the means by which some sort of privacy for the radio conversations was assured. **The A-3 Privacy Device**, developed by Western Electric, functioned as a voice scrambler for the vital Hawaiian Islands-mainland link (connecting Honolulu and San Francisco). This equipment was in place during the Pearl Harbor attack, and author Roy Blackshear's well-illustrated article presents an an excellent overview of its history.

The development of the National Company coil-catacomb radios during the mid-1930s, under the leadership of James Millen, was a milestone in communications receiver design. The author of this paper, Lawrence Ware, has identified over sixty variants of the design over its thirteen-year production life. This article, illustrated by numerous photos from the original National Company archives, organizes the models into a coherent picture that will be of substantial aid to collectors.

AWA Review Volume 11 is a must-have addition for the library of any serious radio collector and historian. The 6" x 9" soft-cover book contains 236 pages and over 200 illustrations. Cost is $20.00 postpaid. To order a copy, send your check or money order to Edward M. Gable, AWA Museum Curator, 187 Lighthouse Rd., Hilton, NY 14468.

trict plant superintendent, helped in the preparation of plans for the new plant from antennas to receiver locations. There were several others, officers and enlisted men whose names I have forgotten, who contributed to this work.

It is not part of the Vint Hill saga but not long after the establishment of that facility, a second location for a large monitoring station was acquired. Located at Petaluma California, about 40 miles north of San Francisco, it was called Two Rock Ranch, or Station 2. Plans for this station were also prepared at Arlington Hall.

The receiving equipment used at Vint Hill was principally the Hammarlund Super Pro. These were excellent receivers of that period, and were being manufactured in quantity. The Super Pros had two RF Stages to reduce image response and oscillator leakage, and they were preferred by the operating staff at Vint Hill. Two receivers were installed in a rack at each monitoring position.

With the greatly enlarged installation at Vint Hill, and with the use of directional antennas, it became necessary to have an effective and trouble free means of connecting several receivers to one antenna. Simply tying several coaxial receiver inputs in parallel would reduce the signal input level on all receivers drastically. Here again television technology from the field test in New York was very helpful.

New high gain/bandwidth tubes (the 1851 and 1852) made possible the design of a broad-band device we called the multi-coupler. This was to have one input and ten outputs with essentially unity gain and a useful bandwidth of from 2 to 20 MHz. On my trip to Riverhead, I had discovered that they had an excellent shop facility capable of producing small quantities of specialized communications equipment.

I made another trip to Riverhead to obtain their cooperation. They agreed to do the necessary design and development work and to accept an order for the number of multicouplers necessary for the new installation at Vint Hill. This was a most fortunate arrangement since I doubt that these units could have been provided as quickly any other way.

Work on cleaning and reconstruction of the old barn progressed rapidly. By late September, operations were being transferred to some of the new positions—which were fed by the new antennas rapidly taking form on the 60 foot poles outside. With the quiet radio location provided by Vint Hill and the improved radio facilities, the performance of Station One was rapidly becoming more effective.

There was one continuing and difficult problem, however. That was the training of operating personnel. Sgt. Balyck and the skilled staff from Fort Monmouth were spread thin in trying to indoctrinate the new operators. In addition, trained operators were also needed at other SPSIS stations, and these needs were frequently filled by transfer of personnel from Vint Hill.

Shortly after the invasion of North Africa, late in 1942, it was necessary to provide a mobile Signal Intelligence Company which was to copy with pad and pencil rather than typewriters. But operators trained to copy with typewriters at 30 words per minute could only copy 12 to 15 words per minute with a pencil. A crash training course to get these operators up to 20 words per minute was immediately undertaken.

It should also be mentioned that with the large increase in staff at Vint Hill there were many promotions for those whose work merited recognition. An outstanding example of merit was Master Sergeant Balyck. Plans were initiated to have him commissioned until he heard of the plans and raised an objection.

He felt that with a commission he would have increased duties involving paperwork and administration, which he disliked, and less opportunity for radio operation, in which he excelled and which he enjoyed. The problem of recognition in a manner satisfactory to Sgt. Balyck was solved by arranging a promotion to the grade of Warrant Officer. I believe he was the only Warrant Officer at Vint Hill which I'm sure he appreciated.

I believe it was late in 1943 that an additional area at Vint Hill was purchased. This was, I understand, to provide additional training facilities for cryptographic personnel needed to provide secure communications. Since I was not involved, and since this facility known as B Area did not affect A Area in any way, I will have no further details or comments.

During the winter of 1943-44 I was sent on temporary duty to Fort Schafter, Hawaii, to assist in the location of, and planning for, a new and much larger Station 5. It was to be located north of Honolulu and a tentative site had been selected in the pineapple fields of Helemano. The Hawaiian Pineapple Company objected strongly to the selected site since it would occupy and destroy many areas of prime pineapple land.

There were several conferences with H.P. officials, as a result of which an agreement was reached which permitted the project to go ahead. The station would be built underground with small structures above ground to provide access and entry of antenna lines, power, etc. The an-

(continued on page 58)

HEADSET ROUNDUP

In the February, 1999 OTB*, we printed "The Master Headset Finder," a complete version of Dick Mackiewicz's famous headset list, incorporating all of his known updates. This was done both as a memorial for Dick, our headset columnist, who became a Silent Key on November 16, 1997, and as an inducement for others to add to his headset research.*

At that time readers were invited to survey their own headset collections and send in any additions or corrections to the list. We got some great participation and the results follow. The name of the contributor is shown in parenthesis after each item. We continue to encourage additions to the list, so if you haven't gone through your own headset collection please do so! Contributions will be held until enough have accumulated for another "Headset Roundup."

Additions to the list

Western Electric D12522
(Sam Seldon)

CANNON-BALL President
C.F. Cannon Co., Springwater, N.Y. U S A
(Clive Oakes, VE3YB)

Frost, No 165 1.5k
(Dale)

Kellogg, 64B
(Dale)

Radio Speaker Inc, ANB-H-1
(Dale)

C.F. Cannon #25
(Dale)

RPh 2, 2k M (no other markings)
(Dale)

Neufield & Kuhnke, Kiel Germany
(Unmarked)
(Dale)

Bosch & Co Berlin W15 Germany
(Frank Camenish)

Vox Humana 2000 Ω
(Frank Camenish)

The Simplex Phone RS Wallace Co.,
Chicago
(Frank Camenish)

German military headphones 4kΩ marked
only as follows:
Dth.b 41 dNz.
(Keith Coulter)

The following may be additions to the list,or just additional data for models already listed.

Western Electric
ANB-H-1 with MC-162-A rubber cushions
250Ω
(Karl Laurin)

Shure Brothers
ANB-H-1 D173120
larger unmarked rubber cushions
100Ω
(Karl Laurin)

Trimm Professional
Trimm, Inc., Libertyville, Illinois
2kΩ, all bakelite earpieces
(Karl Laurin)

Exact wording and typography on the case
of a Baldwin Type C:

MANUFACTURED
AND SOLD BY THE
BALDWIN RADIO CO.
SALT LAKE CITY, UTAH
UNDER NATHANIEL BALDWIN'S
PAT. MAY 10, 1910
SEPT. 14, 1915
TYPE "C"
(Arthur M. Wilson)

Telephonic Corporation Type TH-37, 3k
(Dale)

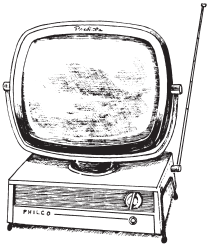
Tower Supersensitive, 1.5k
(Dale)

Trimm Dependable, 2k
(Dale)

(continued on page 51)

TELEVISION

EDITED BY **RICHARD BREWSTER**, 145 LITTLE PECONIC BAY ROAD, CUTCHOGUE, NY 11935 *PLEASE INCLUDE SASE FOR REPLY.*



The First Post-War Philco TV?

Here are some details on an intriguing set I found pictured in a Philco manual entitled "The Servicing of Television Receivers." The manual is not dated but appears to have been printed in 1946. Note that the chassis photo shows a 5-button channel selector, but the cabinet photo shows a selector knob installed on what looks like a filler panel. Perhaps the panel covers an opening originally intended for the push buttons. The schematic shown in the manual also indicates push buttons.

This is a "pre/post war" crossover design apparently manufactured before the 48-1000 series. Perhaps it was just a test receiver or prototype, but the rather compete documentation in the manual suggests that the receiver was in regular production. Here are some details on it that should interest you collectors out there!

The mysterious Philco as installed in a handsome grained cabinet.

1. Designed for 525 lines rather than the 441 line standard used on sets built before 1941. Sound is FM instead of the AM typical of pre-war sets.

3. This model has an RF stage, which is not normally found on 1939/1940 TV receivers.

4. The set has AGC (automatic gain control), a common feature of post-war designs.

5. The horizontal oscillator utilizes a thyratron (gas) tube, a rare or unique feature.

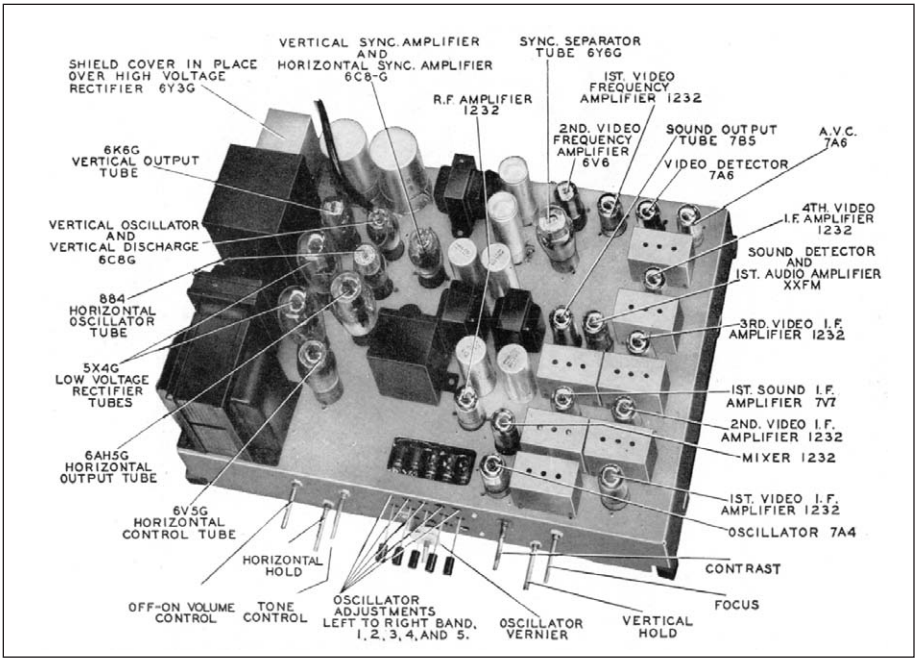
6. High voltage is supplied by a 60-cycle power transformer rather than by RF, or "flyback," circuit typical of post war designs.

7. Push buttons for 5 channels only—no provision for channels 7 through 13.

8. The set is equipped with octal and loctal tubes only—no miniatures.

9. The CRT is a 1OAP4, a rare tube not found in any of my references.

So, TV enthusiasts, be on the lookout. Maybe *you'll* be the one to uncover one of these exotic and rare models!


VERTICAL SYNC. AMPLIFIER AND HORIZONTAL SYNC. AMPLIFIER 6C8-G
SYNC. SEPARATOR TUBE 6Y6G
SHIELD COVER IN PLACE OVER HIGH VOLTAGE RECTIFIER 6Y3G
R.F AMPLIFIER 1232
IST. VIDEO FREQUENCY AMPLIFIER 1232
2ND. VIDEO FREQUENCY AMPLIFIER 6V6
SOUND OUTPUT TUBE 7B5
A.V.C. 7A6
VIDEO DETECTOR 7A6
6K6G VERTICAL OUTPUT TUBE
4TH. VIDEO I.F. AMPLIFIER 1232
VERTICAL OSCILLATOR AND VERTICAL DISCHARGE 6C8G
SOUND DETECTOR AND IST. AUDIO AMPLIFIER XXFM
884 HORIZONTAL OSCILLATOR TUBE
3RD. VIDEO I.F. AMPLIFIER 1232
5X4G LOW VOLTAGE RECTIFIER TUBES
IST. SOUND I.F. AMPLIFIER 7V7
2ND. VIDEO I.F. AMPLIFIER 1232
6AH5G HORIZONTAL OUTPUT TUBE
MIXER 1232
IST. VIDEO I.F. AMPLIFIER 1232
6V5G HORIZONTAL CONTROL TUBE
OSCILLATOR 7A4
HORIZONTAL HOLD
CONTRAST
FOCUS
OFF-ON VOLUME CONTROL
TONE CONTROL
OSCILLATOR ADJUSTMENTS LEFT TO RIGHT BAND, 1, 2, 3, 4, AND 5.
OSCILLATOR VERNIER
VERTICAL HOLD

Chassis photo of same set shows push buttons rather than the selector knob seen on cabinet photo.

HEADSET ROUNDUP, *continued from page 49*

Trimm Professional, 2k
(Dale)

The Trimm receiver CRX-481964 in the original list perhaps should have a a "CTX" prefix instead of the "CRX" according to my file of U.S. Navy's Manufacturer's IDs
(Fred Chesson)

Asterisk removal

Certain sets are shown with asterisks in the original list, indicating that they had been found in advertisments but no actual examples were known. Following is information about two of these cases:

I have one of the "asterisked" headsets in my collection:
Nathaniel Baldwin, Salt Lake City, Utah
Pat May 10, 1910 Sep 14 1915
Type E
(has mica diaphragms, original green cord, 1500Ω DC Res)
(Keith Coulter)

Excerpt from a letter received from Joseph Mente, KF9RY, 20880 Thornwood Cir., Olympia Fields, IL 60461:

In my small headphone collection, I have a pair of phones which could be the DELTA Model 501 GOLD STRIPE 3k.

These phones have nickel-plated brass cases with hard rubber ear caps. The cases are stamped DELTA and DELTA ELEC. COMPANY MARION IND. USA, in the form of a triangle. Their resistance measures 3.2k. The cases are not marked 'Gold Stripe' or '501' anywhere, inside or out. However, what makes me think the phones might be 'GOLD STRIPE' are the headbands. These are made of the usual heavy black fabric, but each band has a ⅛-inch gold strip woven down its center. The stripe runs the entire length of the bands on both sides.

Perhaps if you publish this description we can get comments from someone who has a DELTA ad with a picture of the elusive phones. Feel free to include my address in case anyone cares to correspond with me.

EDITED BY **BRO. PATRICK DOWD, F.S.C., W2GK**, 4415 POST RD., THE BRONX, NY 10471-3499
PLEASE INCLUDE SASE FOR REPLY.

Tube Lore: Some Rediscovered RCA Special Tubes *(Conclusion)*

By Ludwell Sibley

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The May issue of this column presented the first part of Lud Sibley's RCA special tube listing (covering the 1600 series of numbers). This is the conclusion of the listing, covering numbers in the 1800, 1900 and 2000 range. Lud's original introduction is repeated below in its entirety.

RCA made a wide variety of special-purpose tubes under numbers that it assigned in the 1600s to 2000s. These were mostly types that were so specialized that they didn't fit the regular public registration and numbering process: specials for only one customer, tubes uniquely selected from mainstream types, tubes that were to be kept confidential, etc. Some of these, like the workhorse 1625, were made by the millions, by essentially every maker in the tube industry.

At one time, almost every broadcast engineer was familiar with special audio types like the 1620. Others were so obscure that essentially nothing is known about them today. Most were never listed in RCA's HB-3 professional tube handbook, let alone the RC-series manuals. Some are tantalizingly brief entries in military cross-reference books—brief, and often misleading. While there was some specialization in the numbering (1800s were TV types, 1900s were mainly vacuum gauges), RCA people apparently viewed the whole number series as a unit: the 1816P4 was referred to as being in the "1600" series.

Digging up data on "unknown" tubes is real detective work, but can solve a "whatzit" in one's collection. The most recent contribution in this area is Jim Cross' discovery of information on the 1669, 1680, 1682, 1684, and 1692 (*OTB*, Feb. 1998, pp. 56-58). Fortunately, Brother Patrick Dowd, W2GK, saved a large archive of RCA tube records when the Harrison, NJ tube plant closed in 1975. Recently loaned to me by the AWA Museum, this cache includes product-management binders with records on a large group of previously unreported 1600-2000 specials. Supplemented by further data from collector Jerry Vanicek, this information yields the list below.

In a few cases (the ones numbered below 1645), some information was known before, but the RCA records provide additional insight. There's also a vast amount that's new: computer memory tubes, Nuvistors, a color picture tube, etc. Some of these 1600-series numbers were RCA internal identifiers, never branded on actual tubes, but most are likely to appear on rare samples in collectors' hands. Some, like the 1646, didn't necessarily reach production. Codes in {brackets} are RCA developmental numbers.

1800s

1807P1 CRT {C7429}, "Secret Government type" as of 1941.

1815P7 CRT {C7442}, "Secret Government type" as of 1941.

1816P4, A CRT, like 10BP4 but w/o ion trap, aluminized screen (very early use of aluminizing), heavy lead-glass bulb, special 9-pin button base w/ aligning plug and indexing key. Intro. 1946. Sale limited to RCA Victor division for use in TV monitors. "A," intro. 1953, has filter-glass faceplate. 1817P22 Color CRT, sim. to 15GP22 but tested for monitor service {C73599E}. Intro. 1954.

1900s

1904 Mercury thyratron, withdrawn 1946 as obsolete but then reinstated for renewal use by having GE brand their FG-67s "1904."

1945 (A known type, but with new description). Hydrogen-sensitive ionization gauge for leak location, intro. 1947 {C7793A}. Used in

"Nelson" leak detector. Could be sealed to either metal or glass vacuum lines. The vacuum system under investigation was probed by flushing w/ H2. H2-sensitive plate in this tube is palladium, which is normally an impermeable membrane between the vacuum system and the separate vacuum of the tube, but which is permeable to H2. Ratings: heater 6.3 V @ 900 mA, 300 V, 7 W; able to detect 10-4 liter-micron/sec of H2. The 1945 was used with RCA FM-2780 H2 generator, which was a nichrome heating element sealed into a 6H6 shell, with a top tubulation for coupling to an exhaust system, to sensitize the palladium element in the 1945. FM-2780 was made on a model-shop basis due to low expected demand (100 tubes/yr).

1946 (A known type, but with new description). Originally numbered 1663. Thermocouple vacuum gage, Nonex glass bulb 6" long, 1⅝" dia., flying leads, range below 1 mm Hg {C781}, heater 1 V @ 70 mA, intro. 1944; supplied to Central Scientific Co. etc.

1947 (A known type, but with new description). Pirani vacuum gage, soft-glass T9 bulb w/ tubulation on small 4-pin base, usable between 0.5 and 0.01 mm Hg {C778A}. Intro. 1947. Operates at 10 V and ca. 100 mA (depending on pressure). Each tube was calibrated during manufacture for use in a bridge circuit; filament and calib. resistor add up to 135.8 ohms.

1948 Ionization gauge in min. bulb, used only in RCA Type B electron microscope. Dev. 1942, sold only to RCA Victor Div., under dev. number {C787A}. Withdrawn in 1948 and redefined (like 1660) as a service part.

1949-50 (Known types, but with new description). Ionization gauges, intro. 1947, 2 1/16" dia., 4 15/16" long w/ tubulation; two heaters, 5 V @ 3.5 A each. Grid operates at +135 V and 10 mA; plate at -30 V. Suited to measuring pressure below 10-4 mm of Hg.

1949 Hard-glass bulb {C785}.

1950 Soft-glass bulb {C791}.

1960, 61 Spark-gap radar TR tubes, intro. 1941. Domed glass bulbs mounted by flange at base. Data sheets (classified "Confidential") listed as "protective tube." Declassified 1945.

1960 Intended for early radars built by RCA Victor {S836}. Withdrawn 1946.

1961 1960 w/ different gas mix and pressure {S834B}. Supplied only to Evans Signal Lab. for early radar tests; type 1960 turned out to be preferred. Intro. 1942; withdrawn 1945.

2000s

2002 Photomultiplier, a 931A tested to Guide Lamp specs for use in headlight dimmers {C7166}. Originally supplied only to Guide Lamp Division of General Motors and branded w/ their part no. 5,943,346. Later de-restricted and registered as 6323. Probably the tube used in "Autronic Eye" offered for the 1953 Cadillac.

2003, 2010 Computer storage tubes of "Williams" type, 3", 3KP1 w/ longer bulb giving higher deflection sensitivity and lengthened electron gun for low-current/high-resolution spot. Has calcium tungstate screen/storage layer. Introduced 1952; sold only to IBM. Tubes were never to be turned upside down. (A common CRT could be used as a 1024-bit data store by dividing the screen into a 32 × 32 array of storage sites. Deflecting the beam into each area, "ones" were stored as bits of charge on the tube face, and read out by measuring changes in beam current. A 32-bit data word required 32 CRTs. The National Bureau of Standards "Standards Western Automatic Computer" (SWAC), in use at the UCLA Computer Center as late as 1961, had a 1K memory comprising a cabinet with 32 tubes.)

2003 Has external conductive coating {C73365E}. Branded "IBM-85," not "2003."

2010 Lacks conductive coating {C73578}. Same as 2003 specs-wise, but tested only to oscillograph requirements. Branded "IBM-85A," not "2010."

2005, 06 Military T2 submin. specials, classified "Confidential," intro. 1953.

2005 Apparently a filament type; otherwise undefined {A2442}. Later, an RCA commercial digital readout.

2006 Pentode; otherwise undefined {A4692}.

2010 See 2003.

2011 Min. duodiode, 6AL5 tested to the (then-obsolete) JAN spec. of Jan. 31, 1951 {R6269F}. Sale limited to IBM. Etched "6AL5" but also branded "IBM" w/ part no. Intro. 1953; never actually sold (IBM used regular 6AL5 instead); withdrawn 1955.

2012 Computer storage tube, 5", electrostatic focus and deflection {C73345A}, introduced 1953. Sold only to Engineering Research Associates. Not branded "RCA." Expected production, 300 tubes.

2013, 14 Computer types, regular designs w/ 48-hr. aging and 1000- hr. life test. Sold only internally, for use in RCA BIZMAC computer.

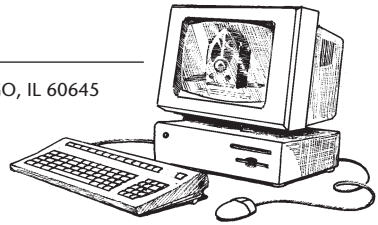
2013 Duotriode, special 6211 {A4659C}. Introduced 1954; withdrawn 1966. One-shot production of 15,000 tubes.

2014 Video pentode, special 6197

(continued on page 61)

On the Internet

EDITED BY **CHUCK SCHWARK**, 7454 N. CAMPBELL AVE., CHICAGO, IL 60645
PLEASE INCLUDE SASE FOR REPLY. E-MAIL: caschwark@aol.com



There's Gold in Them Message Threads!

In this issue, I thought we'd take a different tack. We'll explore some of the "meat" that can be found by "surfing" the Internet, including radio-related news groups and message lists, for antique radio related items of interest. Following is a message thread that appeared on the Boatanchors Mailing List a while back regarding the life expectancy of wax-paper dielectric capacitors. It continues to be a very pertinent topic for collectors and restorers.

The original question...

The thread began when one person, having seen data indicating that most wax-paper capacitors "died" not from use, but just from old age effects, asked if this were true.

Note: the older term "condenser" and the newer "capacitor" will be used interchangeably in this article.

Here is a reply to this question...

"(From "Reference Data for Radio Engineers,"1949) Capacitors—paper-dielectric Life—voltage and ambient temperature: Normal paper-dielectric-capacitor voltage ratings are for an ambient temperature of 40 degrees Centigrade (104 degrees Fahrenheit), and provide a life expectancy of approximately 1 year of continuous service. I guess most of them die not from use (1 year = 8,700 hours) but from old age...Comments?"

... and the reply to that...

"Good question. Alfred Ghirardi, in "Radio Physics Course" (1931-33) gives a detailed explanation of how wax-paper condensers were made, and states that they are designed to have an operating life of 10,000 hours. He mentions a failure mode involving dielectric breakdown of the paper dielectric. At the time he was writing, the type of wax-paper condenser that we talk about changing out in an old box (i.e. radio) was fairly new.

To make some estimate of usage of home entertainment radios in the 1930 period, assume that the set was operated four hours per day, five days per week. That gives about 1,000 hours per year of operation, and 10,000 hours would be about ten years of service. The 10,000 operating hour figure is a fairly common one, both for commercial and consumer electronics design.

The question arises, how do you prove that these components will last for ten years, operated at 1,000 hours per year, without using up ten years in a "real life" test? Here, you get into attempts to devise "accelerated life tests" that will induce failures fairly quickly, and great statistical studies that supposedly extrapolate out to something that more or less represents real-world use of something. A sociologist friend of mine, who gets hired to set up statistical research studies is rather blunt in saying that all such studies are "demonstrably flawed."

I say this to point out that accelerated testing requires a lot of assumptions, and that not all factors relating to failure modes get included in accelerated tests. Almost any device has aging mechanisms that accumulate some sort of "service life" or deterioration while sitting unused in storage. The stuff we are collecting has been around for somewhere between forty and seventy years, and it is well to remember that most of the manufacturing processes used to make this stuff were only a few years old when it was made. It's easy to find a 1935 capacitor in 1995. But there were no 1875 capacitors to study in 1935 that used anything like a similar technology to that used in 1935. Current capacitor manufacturing technology is much closer to that of the thirties and forties.

I think we have to remember that before the 1970s space programs, genuinely high-reliability electronics didn't exist. By the end of WWII, it was very evident that wax-paper condensers were prone to a steady flow of failures throughout their service life, and that they were close behind vacuum tube faults as a failure mechanism. The total recapping we talk about today was being practiced in 1950.

I'm not sure whether the failure mechanisms we see today are greatly different from those seen 45 or so years ago. Moisture contamination and mechanical breakage seem to me to be at the head of the list in both instances, but I have some "high quality" wax-papers in a 1944 box that show high leakage and appear to be built and mounted so that mechanical problems shouldn't be an issue. The molded paper capacitors of the fifties seem to have problems of their own, even though they are made with solid jackets to keep the leads from wiggling, and so forth.

Accelerated testing may predict a 10,000 operating hour service life, and testing for 10,000 continuous hours of operating may confirm that prediction. But many of the caps we see to day have accumulated as little as 1,000 hours of operation in periods on the order of fifty years. The high frequency of failure we observe today simply proves that whatever predictions were made, and whatever tests were devised, that they didn't simulate the effects of decades of sitting on the shelf in a variety of environments."

This reply then brought up another question in the same vein...

"If it was known around 1950 that wax-papers weren't all that great, when did the industry stop using wax-paper capacitors? Or to better phrase the question, when did a capacitor superior to wax-papers come out? Was there a better replacement available around 1950, or were recap jobs then just done with new wax-papers?"

...and the reply was...

"I'm not sure I've accurate answers to these questions, but do have some recollections from the 1945-60 period. There were always "better" capacitors than the wax-papers. They cost more money. My Hallicrafters S-36A has zero wax-paper caps and zero electrolytics in it. Someone like Dave Stinson, who collects WWII era military electronics can comment on the details of what's in that equipment, but my recollection is that "JAN spec." (Joint Army-Navy-"MIL" is from the 1948 realignment of the armed services) equipment used "postage stamp" and "bathtub" caps. The smaller values of "postage stamp" caps are mica, the larger ones use "paper," although I suspect the dielectric material was higher quality than used in the wax-impregnated jobs. The bathtub caps are in hermetically sealed cans, with a variety of dielectrics. Also, there were grades of wax-paper caps, which can be viewed as "cheap" and "expensive." The S-36A uses a number of ceramic dielectric caps. The early ones were made on ceramic tubes."

My recollection of repair parts inventories

More links to interesting Web sites:

Bellingham Antique Radio Museum
http://www.antique-radio.org/radio.html

Rovero's Radio Page
http://www.connix.com/~provero/rovero.htm
Hammarlund, Collins, RCA, Halicrafters, and military sets.

The Radio Restoration Aboard the HMCS Haida
http://www.mindspring.com/~johnmb/haida.htm

Telegraph & Scientific Instrument Museum
http://www.chss.montclair.edu/~pererat/telegraph.html
Museums dedicated to the preservation of Telegraph History, Lore, and Instrumentation

The Museum of Old Tektronix Scopes
http://margo.student.utwente.nl/~wel/tek.htm
Information on and images of old Tek scopes up to about 1970.

Museum of Radio and Technology in Huntington, West Virginia
http://oak.cats.ohiou.edu/~postr/MRT/

Radio Bay
http://www.io.com/~nielw/index.htm
WA5VLZ's Web page having to do with the National Radio Company

Telegraph Lore
http://www.cris.com/~gsraven/index.shtml
These pages are dedicated to the study of all aspects of Morse telegraphy.

KK5IM Amateur Radio Home Page Collins
http://www.teleteam.com/~jmiller/hamhome.html

The Telegraph Office
http://fohnix.metronet.com/~nmcewen/ref.html
A Tribute to Morse Telegraphy and Resource for Wire and Wireless Telegraph Key Collectors and Historians

used by service shops after 1946 is that they had molded paper caps for replacement of the wax-papers. These had a much better track record in the short term, although, as many of the postings here indicate, after 30-50 years, they are just as troublesome as the old wax-papers.

Disc ceramics, as I recall, were a feature of the early fifties. My HQ-150, which was built in 1956, uses disc ceramics, and has had 100% survival of the originals. I have no real "handle" on the later users of wax-paper caps. I have heard tales of wholesale recapping of late prewar radios, and it appears that this was related to original manufacturing quality as well as operating temperature.

The real volume in service shop business was in vacuum tube replacement and replacement of early electrolytics, and if the faults went beyond this, the radio was considered a "dog." You'll see wax-papers in mid-fifties boxes. There are several factors here. Cost is a big item—as long as wax-papers were the cheapest that would do the job, they were used in low-priced stuff that was sold in "price-first" markets (the equivalent of K-mart and Wal-mart today).

Also, if the manufacturer was primarily an assembler, light on in-house engineering capability, and they weren't dealing with a lot of warranty repairs, they would have stuck with the old technology until price clearly favored using the new. There is a good deal of wisdom in the "if it is working, don't fix it" adage. Remember that electronics of the early postwar period were generally built with the idea that five years was an adequate service life."

Finally the original person asks...

"And now the really scary question. Will I have to redo my recap jobs of today 15 or 20 years down the road?"

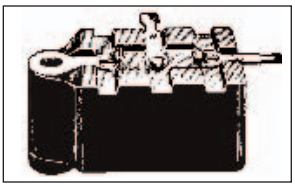
…and the answer…

"Good question. In truth, no one knows. But remember that the stuff we are discussing on the boatanchors list was not built in 1980 or 1975, which are your "15 or 20 years." We are talking about stuff that is two or three times that age, and that has been "stored" for periods like 15-20 years. I put "stored" in quotes, because the item may have sat in a barn with a leaky roof and been rained on for 20 years."

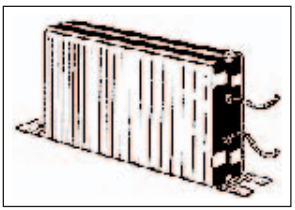
Wax-paper caps in sheep's clothing!

Most "old timers" can spot a wax-paper capacitor in any radio chassis, but some of the newcomers to the hobby, who may not have the experience or electronic background, will miss a capacitor or two in their restorations. Of course, most everyone is familiar with the quintessential rolled yellow paper tube covered in gloppy, dirty and oozing wax, but many paper caps will be hidden from the undiscerning eye.

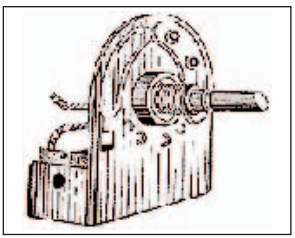
Black Beauty molded wax-paper condenser.



A typical Philco Bakelite Block condenser.



Philco metal-can condenser.



Tone control assembly with potted cap.

For instance, Philco used the paper and foil construction in their bakelite block condensers. (You'll find an article on re-building bakelite blocks on my website.) Wax-paper types also sometimes lurk in metal-can assemblies bolted to the chassis as well—often multiple sections. Philco's potted tone control assemblies were just like the bakelite blocks, except they used a metal shell for the condensers.

The early molded bakelite capacitors (one such brand was the "Black Beauty") usually had a typical wax-paper slug inside their tubular bakelite shells.

New Books and Literature

EDITED BY **WILLIAM E. DENK, W3IGU**, 81 STEEPLECHASE RD., DEVON, PA 19333-1226
PLEASE INCLUDE SASE FOR REPLY.

On The Short Waves 1923-1945—Broadcast Listening in the Pioneer Days of Radio

By Jerome S. Berg. Published by McFarland & Co., Inc., 1-800-253-2187, P.O. Box 611, Jefferson, NC 28640, 271 pages, 7½ by 10¼ inches, hardcover, $42.50 plus $4.00 S & H.

Author Jerry Berg, an AWA member, is an attorney who serves on the Executive Council of the North American Shortwave Association, and also chairs the Committee to Preserve Radio Verifications. In this book you'll find an excellent history of the pioneer days of shortwave broadcasting, from the early concepts of Marconi through the golden era of the 1930s, and finally through World War II and radio's role as news source and propaganda tool.

This profusely-illustrated, well-written book vividly brought back to this reviewer his own introduction to short-wave listening with a Crosley multi-band radio of 1934 vintage. I remember the thrill of DXing, and the unease with I listened to the gathering storm of WWII as clearly forecast in the transmissions from London and Berlin.

Berg covers his topic in three sections: the early (pre-1930) days; the coming-of-age of shortwave broadcasting in the 1930s with its many popular magazines devoted to the hobby; and finally the war years (1940-1945).

Referring to the latter period, Berg devotes several pages to "Shortwave Traitors"—nationals of Allied countries who broadcast to their fellow countrymen on behalf of enemy powers. Included was "Lord Haw Haw," a British national who moved to Berlin, where he participated in Germany's radio war against England and, later, against the United States. The British government executed him in 1946. "Tokyo Rose'' was evidently a generic name applied to a number of English-speaking women heard in Pacific regions in the 1940s.

One of the many popular magazines of this era was Hugo Gernsback's *Short Wave Craft*, which sought to provide its readers with reliable information on the operation of the shortwave stations of the world. Page 168 of Berg's book reproduces a page from Gernsback's June 1934 issue illustrating the magazine's silver-plated "Trophy Cup." The cup was presented monthly to the reader who contributed to the "advancement of the art of radio" by logging the largest number of shortwave broadcast stations in a 30-day period. Astonishingly, your reviewer's wife acquired one of these trophy cups, silver plating still intact, at a local flea market some years ago. This one had been awarded to Oliver Amlie, whose name is mentioned on page 169 of Berg's book!

♦ ♦ ♦ ♦

Los Angeles Radio Manufacturing—The First Twenty Years (1922-1942) Supplement No. 2

By Floyd A. Paul. Published 1999 by Floyd A. Paul, 1545 Raymond Ave., Glendale, CA 91201. 54 Pages, 5½ by 8½ inches, $10.90 plus $3.00 S&H. Available from the author (818-242-8961) and from Antique Radio Classified, P.O. Box 2, Carlisle, MA 01741.

If you have, or recall, Paul's book as reviewed in the November 1996 *OTB*, don't be misled by the similarity of the titles. This is not a revision of the earlier book, but is instead an extension based on all-new material. The principal manufacturers whose products are described and pictured in this book are Breting Radio Manufacturing Company, Flint Radio Company, Gilfillan Bros., Inc., J. W. Miller Company, Mission Bell Manufacturing and distributing Co., Radio Product Sales Co., and the Wireless Shop.

Except for Gilfillan, it is unlikely that Eastern collectors will find products of these manufacturers in their collections. But judging from the many photographs and the supporting text, some of these west coast offerings were certainly interesting. For example your reviewer learned that in early 1921, the Wireless Shop sold a very respectable line of loose couplers, ranging in price from $10.00 to $24.00 that resembled his J. F. Arnold model of 1914.

Paul reveals that many of these manufacturers were too small to obtain an RCA license (RCA demanded a minimum annual royalty of $100,000.). Some solved this problem to RCA's satisfaction by having their chassis wired by Gilfillan, a licensee who "'placed the licensing tag

on the sets."

As author Paul, an active AWA member, notes, old timers are disappearing and new information has dried-up. Collectors are certainly indebted to this author for digging up and preserving what information there is in his three books on the subject of Los Angeles producers of early radio equipment.

♦ ♦ ♦ ♦

Crystal Set Loopers—A 3-Tuber & More
Published 1999 by The Crystal Set Society, Rebecca Hewes, Editor, 1-800-927-1771, P.O. Box 3026, St. Louis, MO 63130, 6 by 9 inches, soft cover, 128 pages, $15.95, S&H free if you mention AWA.

The Crystal Set Society, which has a worldwide following according to editor Hewes, is dedicated to building and experimenting with crystal set radios. U.S. membership is set at $10.95 per year. In Canada it's $12.00 U.S. per year, and $17.00 U.S. elsewhere. Members receive six Society's newsletters per year.

The subject booklet comprises Volume 8 (six issues) of the Society's newsletter in bound form. Therefore prospective new members have an easy way to review the quality of the publications they can expect to receive.

This volume includes a number of interesting construction projects and related topics. For example, detailed instructions, with clear drawings, enable the reader to build a replica of the old Steinite wave trap and crystal set tuner. In the 1920s this was advertised as an interference eliminator; it sold for $1.00!

Another article was directed to tests of molybdenite crystals. The test results demonstrating that, when used with an appropriate bias voltage, molybdenite was almost as sensitive as galena, and better than silicon.

A variety of crystal set circuits are described, including a shortwave set with a large two-turn loop antenna formed from about 20 feet of 3/16-inch copper tubing.

Included in the booklet is the Society's "Membership Correspondence," of which there is a fair amount, plus some membership questions and answers.

RADIO MONITORING, *continued from page 48*

tennas and transmission lines, similar to those at Vint Hill, would be so located as to minimize interference with planting and cultivating of pineapples. The land would continue to be used for agriculture. Detailed plans were prepared at Arlington Hall and forwarded as rapidly as possible to the Signal Service at Fort Shafter.

In August 1945 I was sent to Fort Richardson, Anchorage Alaska, for two reasons. One was to inspect Station 7, our monitoring station in Fairbanks, and to recommend any feasible changes that might improve its performance. The other was to aid in the selection of an operating site in the Aleutian Islands for a Signal Service Company (I believe it was the 121st) then located at Fort Richardson.

I made a trip down the chain with the CO of the SI Company to the island of Amchitka, not far from Kiska and Attu at the end of the chain. There we were shown a site West of the base which had access and sufficient level ground for an antenna field appropriate for the monitoring of Japanese communications. There were facilities at the base for the installation of the limited field of antennas and other provisions needed by the SI Company.

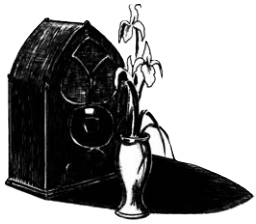
Returning to Anchorage, I went immediately to Fairbanks. By strange coincidence, I was in the office of the Chief Signal Officer of Ladd Field when word came of the bombing of Hiroshima with the effect of 20,000 tons of TNT. I returned to Fort Richardson and sent a message to Washington to the effect that unless instructed to the contrary I would return to Washington. Two days later I received instructions to act as per my wire and return to Washington.

This effectively terminated my wartime service. I returned to NBC approximately November 1st. I am glad to have had the chance to serve as I did and I appreciate the confidence given me by General Preston Cordeman, who was in command of the Army Security Agency for the final months of my service in the Agency. It was he who appointed me Chief of E Branch, with responsibility for all classes of personnel and for the functioning of an important part of the Agency. I hope and believe he was pleased with my service in this capacity.

I was also happy to have had the opportunity of knowing the legendary cryptanalyst, Billy Friedman. I learned quite a lot about language from him and others at the Agency. It is hard for me to realize that it is now almost 50 years since all this took place.

Robert M. Morris, Sparta, NJ, March 10, 1992.

Recent Radio, TV and Entertainer Obituaries



COMPILED BY **CHARLES S. GRIFFEN W1GYR**
1225 NEW BRITAIN AVE., WEST HARTFORD, CT 06110-2405

Note: When known, the date of death is indicated in parenthesis.

JAMES BLADES, 97, (5-19-99) British percussionist. During WWII he created the "V-for-Victory" Morse code signal broadcast by the BBC to encourage Resistance in continental Europe. The dot-dot-dot-dash recording was transmitted 150 times a day. He played the timpani, xylophone, marimbas and other percussion instruments with circuses, symphonies and in films. In 1954 he was appointed a Professor of Percussion at the Royal Academy of Music. Blades is the author of a number of books including the encyclopedic reference work, *Percussion Instruments and Their History.*

LEE H. BOLEN, 90, W6UP (2-11-99) early broadcast engineer. In 1937 he began work as an engineer/technician for radio station KHJ operated by Don Lee Broadcasting. From 1946 to 1951 Bolen directed and produced radio shows and occasionally did experimental TV work for Don Lee. In 1951 he joined CBS as an associate director responsible for film, live and VT programming for their West Coast operations and program control for their local affiliate, KNXT. Bolen continued to work for CBS as a supervisor of on air operations which included announcers, associate directors and all their broadcast facilities. He retired in 1974.

RORY CALHOUN, 76, (4-28-99) actor. During the 1950s Calhoun established himself as one of the country's leading movie cowboys. He starred in *Way of a Gaucho* followed by *Four Guns to the Border, The Treasure of Pancho Villa and The Hired Gun*. Some of Calhoun's other film credits include *How to Marry a Millionaire, Meet Me After the Show and With a Song in My Heart*. Calhoun is probably best remembered for playing the role of Big Bill Longley on *The Texan* which aired on CBS Television from 1958 to 1960. Some of his other TV appearances include *Ford Television Theater, Death Valley Days* and *Western Star Theater*.

PEGGY CASS, 74, (3-8-99) comedienne. In 1957 she won a Tony for her portrayal of Agnes Gooch in *Auntie Mame* on Broadway and later repeated the role in the film version. Cass made her Broadway debut in *Touch and Go* and later acted in such productions as *Bernadine, Oh, Men, Oh, Women* and *Agnes of God*. Some of her movie credits include *The Marrying Kind* (1952), *Gidget Goes Hawaiian* (1961) and *If It's Tuesday, This Must Be Belgium* (1969). During the late 1950s and the 1960s Cass made regular television appearances in *Keep Talking*, a quiz show, and *The Jack Paar Show,* as well as game shows such as *Match Game, Password*, and *To Tell The Truth*.

ELLEN CORBY, 87, (4-14-99) actress. She is best remembered for her role as *Grandma Walton* on The Waltons which aired on CBS Television from 1972 to 1981. Some of Corby's other TV credits include *The Virginian, The Rifleman, Wagon Train* and *I Love Lucy*. During her sixty-year acting career she appeared in more than 100 films including *I Remember Mama* (1948), *Shane* (1953), *Sabrina* (1954) and *Vertigo* (1958).

RAY FORREST, 83, (3-11-99) the nation's first TV personality. In 1939 he was the first announcer assigned to NBC's experimental television station, W2XBS, when there were fewer than 1,000 television sets in use. Wearing a tuxedo, Forrest, then 23, signed on the station each evening and announced all station breaks and programs, hosted some shows and became the network's first fulltime news anchor. Some of Forrest's other television firsts include broadcasting from an airplane over New York City on March 6, 1940; covering the Republican Convention in Philadelphia in 1940 and appearing in a live television commercial (Adam hats) on July 4, 1941. Forrest produced and hosted the educational program *Children's Theater* which was seen on WNBC(TV) from 1949 to 1960.

FRANK A. GUNTHER, 91, W2ALS (5-24-99) communications and FM pioneer. In 1925 he joined Radio Engineering Laboratories where he constructed and operated one of the first experimental shortwave broadcasting systems. From 1961 until his retirement in 1982 he was president of the firm. In 1928 Gunther installed one of the first one-way radios used on an aircraft and in 1931 took part in the first public

broadcast from an airplane. A year later he installed the first two-way aircraft radio system. In 1932 he built, for the Bayonne (NJ) Police Department, what is believed to be the first two-way mobile police radio system . Gunther was a long-time associate of Major Edwin Howard Armstrong and was present for his lecture and demonstration of FM broadcasting before the New York section of the IRE on November 5, 1935. In 1936 Gunther designed and manufactured the early components for FM radio and from 1939 to 1942 he designed and built more than 25 FM stations nationwide. Gunther was a past president of the Radio Club of America and the president of the Quarter Century Wireless Association from 1974 to 1977. At the time of death he was associated with High Point Tower Technology in Oldsmar, FL.

ALOIS (AL) MAXWELL HIRT, 76, (4-27-99) trumpeter. He began his professional career after WWII as a trumpet player, bandleader and songwriter. Hirt toured with bands led by Jimmy and Tommy Dorsey and Ray McKinley until 1949 when he joined the Horace Heidt Orchestra. Over a fifty year period he recorded 55 albums and won a Grammy award in 1964 for the song *Java*. In the 1960s Hirt was a frequent guest on television programs hosted by Dinah Shore and Andy Williams and starred on *Fanfare*, which aired on CBS in 1965.

SIR FRANCIS McLEAN, 94, (12-19-98) former BBC engineering director. He designed high-powered radio transmitters for Western Electric in England before moving to Paris in 1928 to work for Standard Telephones and Cables. McLean joined the BBC in 1937 and became Deputy Chief Engineer in 1952, Deputy Director of Engineering in 1960 and finally the Director in 1963. He chaired the British Standards Institution Telecommunications Industry Standards Committee between 1960 and 1977 and in 1974 headed a Royal Commission on FM broadcasting in Australia. In 1967 McLean was knighted for his services to broadcasting.

YEHUDI MENUHIN, 82, (3-12-99) violinist and conductor. His musical genius became known to the world at age 7 with a debut violin performance in San Francisco. That event marked the beginning of a 75-year career performing before audiences around the globe. During WWII Menuhin gave 500 concerts for U.S. and Allied troops and for Red Cross fund drives. During his lifetime he used this and other acts of generosity to express his concern for humanity. Menuhin was an advocate of music education in schools believing it could play a vital role in civilizing society. He founded a music school in his name in Britain and a foundation in Brussels, Belgium.

ANTHONY NEWLEY, 67, (4-14-99) actor, singer, playwright, composer and lyricist. At age 17 he gained fame playing the Artful Dodger in the film version of *Oliver Twist*. A sampling of his other film appearances include *Doctor Dolittle, Sweet November* and *Old Dracula*. Some of his stage credits include *The Wind of Heaven, Stop the World, I Want to Get Off* and *The Roar of the Greasepaint*. Newley and his partner Leslie Bricusse wrote the book, music and lyrics for *Stop the World, I Want to Get Off* and the music and lyrics for *The Roar of the Greasepaint*. He composed the score for *Willy Wonka and the Chocolate Factory* and the song *The Candy Man*.

OLIVER REED, 61, (5-2-99) British actor. After a variety of jobs and release from military service he landed a number of roles in horror films. In 1961 Reed got his first leading role in *The Curse of the Werewolf*. Some of the 53 films he appeared in include *Oliver!*, *Women in Love, The Devils*, *Tommy* and *Castaway*. In 1993 he appeared on the CBS television miniseries *Return to Lonesome Dove*. At the time of death he was filming *The Gladiator* on the island of Malta.

CHARLES (BUDDY) ROGERS, 94, (4-21-99) film actor and bandleader. In the pre-band era, while a college student, he organized an orchestra to earn extra income. In 1925 he was selected from a nationwide search to attend Paramount's training school and made his debut in *Fascinating Youth* (1926). Between 1926 and 1957 Rogers appeared in 35 films including *Wings* (1927), the first film to receive an Oscar. Some of his other film credits include *So's Your Old Man, My Best Girl, Varsity, Dance Band* and *Paramount on Parade*. He was married to Mary Pickford for 42 years. She died in 1979.

DR. ARTHUR L. SCHAWLOW, 77, (4-28-99) physicist. In 1981 he was awarded the physics Nobel Prize for helping to invent the laser. After completing his graduate studies he joined the Bell Telephone Laboratories in 1951. Schawlow and Charles Townes (he won the 1964 Nobel Prize in physics for his work on the maser) coauthored the first scientific paper to describe the theory of building a laser in 1959. A year later the Laboratories were awarded a laser patent based on their work. He taught at Stanford University from 1961 to 1991.

WALTER D SCOTT, 84, (3-12-99) former NBC President. After a brief time with Hearst Radio he joined NBC as a radio salesman in 1938. Scott was named Eastern Sales Manager in 1949 and National Sales Manager in 1952. By 1955 he had moved to the TV side and in 1959 was named Executive Vice President. A year

later Scott became president of the NBC Television Network. One of Scott's most notable decisions came in 1965 when he put the entire NBC schedule in full color. The costly and controversial decision vaulted NBC into a ratings tie with rival CBS. He retired from the company in 1974.

TERRY J. STERMAN, 60, W9DIA (3-30-99) founder of Amateur Electronic Supply. As a teenager he worked in his father's TV and electronics parts store, Harris Radio Corporation, in Fond du Lac, WI. In 1957, at age 18, Sterman founded Amateur Electronic Supply which continued in business until it was sold on January 1, 1998. The new owner is Amateur Electronic Supply LLC.

JOE WILLIAMS, 80, (3-29-99) jazz and blues singer. He joined the Count Basie Band in 1954 and in the following year recorded *Count Basie Swings, Joe Williams Sings*. The record was his first nationally known performance of *Every Day I Have the Blues* and *In the Evening*. Earlier he had been associated with the Lionel Hampton Band. In the late 1960s he performed in Las Vegas and in the 1980s on television in the role of Grandpa Al on NBC's *The Cosby Show*. In 1985 he won a Grammy for jazz vocal performance on his album *Nothin' But the Blues*.

Information for this column was obtained from *The Big Bands* (4th edition), *Broadcasting and Cable, The Complete Directory to Prime Time Network TV Shows 1946-Present* (4th edition), *The Hartford Courant, The Institute, QST, The New York Times* and *Variety*.

Thanks to Stanley J. Avery, WM3D; John H. Dilks, K2TQN; Frank Q. Newton, Jr., W6SYG; Richard B. Waddell and Dr. A. David Wunsch for additional source material.

VACUUM TUBE, *continued from page 53*

{A4676F}. One-shot production of 20,000 tubes.

2015 Tetrode thyratron, 5696 w/ 5.4-V, 180-mA heater for battery operation {R6474}. Sold only to Friez Division of Bendix (Baltimore). Used as short-life pulse modulator in dropsondes (radiosondes); one-shot production of 10,000 tubes. Introduced 1956; withdrawn 1959—customer switched to regular 5696. Tubes carry Bendix part no. 524252.

2019 Phototube, 1P42 selected for Eastman Kodak Co. {C7168}. Tested for drift in sensitivity when tube is exposed to strong red light. Used to control processing of color film. Selection yield was about 10%. Intro. 1952. Branded "EKCo. - 2019."

2024, 25 Min. 9-pin duotriodes, regular types tested to IBM specs on life. Sold only to IBM. Intro. 1957; withdrawn 1961; customer was no longer purchasing this type from RCA. No info. available on how tubes were marked.

2024/5965 5965 {A4688F}.

2025/6211 6211 {A4659J}.

2029 Shielded-grid cermet beam triode, 11.4" dia., 8.2" high, two-section T-T fil., 1.35 V @ 1000 A per section, 500 kW, 200 MHz, liquid-cooled.

2032 Pentagrid control (gate) tube, sim. to 1680 and tested the same, but w/ added mica getter shield and taller bulb {A5855}. Sold only to IBM. Intro. 1956; withdrawn (as late as!) 1975.

2033 Min. 9-pin duotriode, constructed identically to 1684 {A40206}. Production testing sim. to that for 5964; life test same as 1684. Introduced 1958. Sold only to Remington-Rand and Minneapolis-Honeywell. Included patentable feature(s); RCA Patent Museum sample was L-4805.

2039 Xmtg. cermet shielded-grid beam triode, 20.5" dia., 37.2" high, dual-ended, thoriated fil. taking 7.3 V @ 1040 A, 500 kW dissipation, 1.5 MW pulse out @ 200 MHz when plate-pulsed, ran at 30 kV @ 70 A peak, plate and beam-forming cylinder liquid- cooled (RCA) (9-26-60). Intended for long-pulse search radars and particle accelerators. Later registered as 6950.

2040 Cold-cathode thyratron, 1C21 w/ unpainted bulb having a conducting "Nesa" coating on dome of bulb as a capacitance- coupled (touch-sensitive) firing electrode {R6336}. Dev. for Otis Elevator Co. for visual-signal control in elevators; intro. 1948; sold only to them; etched "2040" and branded "OTIS" and "Part No. 425A1."

2041 Cermet xmtg. beam power tube, 11.25" dia., 8.9" high, two- section T-T fil., 1.35 V @ 1000 A per section, 20 kW, liquid- cooled, plate-pulsed RF amplifier giving 180 kW out at up to 450 MHz; ran at 23 kV pulse @ 15 A. Introduced 1960.

2057 Duodiode, premium 6H6 {R6016M}. Introduced 1961. Sold to National Cash Register Co. Initial order 4000 tubes. Tubes were branded "2057/6H6."

2071 Octal dissimilar duotriode, variant of

(continued on page 71)

About Our
Feature Article Authors

LARRY BABCOCK
Meet Report Extravaganza!

Larry Babcock grew up in his dad's radio sales and service business, acting as a service tech and installing auto receivers while still in high school. After serving in the Infantry during World War II, he earned a BSEE degree at the University of Iowa and began a 37-year career at Bell aircraft.

At Bell, Larry headed programs to develop radar and air-to-air microwave relay links for the RACAL missile system, and later, to evaluate the Army's military electromagnetic interference problems. During his last years at Bell, Larry was in charge of the design of electromagnetic compatibility (EMC), TEMPEST, ordnance safety, radiation hazards and lighting immunity for all military equipment produced by the company. Later, he worked in these same fields as a consultant for other companies.

Larry began collecting antique radios in about 1973. He specializes in Federal, Wurlitzer, and WWI aircraft sets, and has written a book on the history of Federal radio. He is on the AWA Board of directors and serves as a guide at the AWA Museum in Bloomfield.

JOHN CASALE, W2NI
George M. Phelps—Instrument Maker (Conclusion)
(In "Key and Telegraph")

John's lifelong involvement in radio, telegraphy, and electronics began at age nine when his dad (a Signal Repairman for the Delaware and Hudson Railroad) gave him a telegraph sounder and key from a remodeled depot. He was first licensed as WN2FHL in 1968. John has served in the United States Army Signal Corps as a Television Technician, serviced consumer electronics and worked as a field computer technician. He is currently with Niagara Mohawk Power Corp, where he has primary responsibility for maintaining a analog telemetry system which monitors the New York State power system. He holds commercial FCC Radiotelegraph and Radiotelephone licenses, and is also a Senior CET (Certified Electronics Technician) and a FAA Certified Instrument Flight Instructor. A collector and restorer of landline instruments, he enjoys researching the history of the telegraph industry in the U.S., especially its roots in upstate New York.

ED GABLE, K2MP
Behind the Scenes at the Museum Annex

Ed was appointed Curator of the AWA Electronic Communication Museum in 1997, when AWA founder Bruce Kelley found it necessary to resign because of poor health. Ed has been an AWA member for more than 20 years and has sat on the board of Directors for almost half that time. He is retired from a 32-year career at Harris Corporation's RF Communications Division, where he held management positions in engineering, manufacturing and quality control.

Ed was first licensed in 1957 with the call W2MPM, shortening it to his present call after receiving his Extra Class ticket in 1977. He is past president of the Rochester Amateur Radio Association, twice chairman of the Rochester VHF Group, past president of the Rochester Radio Repeater Association

Also very active in the ARRL, Ed is an Assistant Section Manager in western New York and an Atlantic Division Director. He was recently named the Atlantic Division's Amateur of the Year, in part for his work in preserving the history of radio.

ROBERT MORRIS, W2LV
(SILENT KEY OCTOBER 15, 1997)
Establishment of the Radio Monitoring Station at Vint Hill Farms

Bob began his career at the Western Electric Company in 1923, soon becoming a transmitter operator for AT&T's experimental station WEAF. He stayed on after WEAF was sold to RCA in 1926 and became NBC's flagship station. The following year he became head of NBC's Developmental Engineering Group, participating in the development of television, FM and transcription recording. During World War II, he was Chief Radio Engineer of the United States Army Signal Corps.

At war's end, he returned to NBC, developing new technology for the Radio Recording Division. Later, he joined ABC as Manager of Radio and Video Facilities Planning, eventually becoming a staff consultant to ABC's Engineering Department, a position he held until his retirement in 1967. Bob's recognitions and awards are too numerous to mention here, but the interested reader will find them in Charles' Griffin's "Recent Radio, TV and Entertainment Obituaries" column in the February, 1998 issue.

Bob was first licensed in 1922 as 2CQZ. He was a co-founder of the AWA Review and edited its first three editions. Please see the "Silent Keys" column of the February, 1998 issue for more details about Bob's distinguished ham career and his many contributions to AWA.

BOB RAIDE, W2ZM
Turn Your 1929 Hartley into an "OT Contest" Rig

Bob received his first Amateur license in 1957, when he was 13. In 1964, he upgraded to Extra class and also obtained a First-Class Radiotelephone Ticket.

He attended the University of Miami, after which, in 1967, he took over the family small canvas business. In 1980, he started a sideline radio broadcast business, building and operating several small market stations in the Upstate New York area.

Bob still stitches canvas, but is now a principal in the Radio Corp., a company that owns and operates three AM and six FM stations in the syracuse and Utica, NY Markets.

JAMES P. RYBACK, W0KSD
"FORGOTTEN" PIONEERS OF WIRELESS: Part 5 — Karl Ferdinand Braun

James Rybak was born in Cleveland, Ohio in 1941. He has been interested in both radio and electronics, first as a hobby and then as a profession, for over 40 years. Jim holds B.S., M.S., and Ph.D. degrees in electrical engineering as well as Extra-Class amateur radio license W0KSD. He teaches engineering and mathematics at Mesa State College in Grand Junction, Colorado. In recent years, Rybak has published numerous articles in the U.S. and abroad on the history of both wireless and electrical technology. When not writing articles, he spends his free time trying to achieve "Worked All States" through the low-earth-orbit amateur radio satellites as well as trying to become knowledgeable about digital photography and slow-scan television.

CHUCK SCHWARK
Philco Images: 1920 - 1954

Please see "About our Contributing Editors" for Chuck's bio.

LUDWELL SIBLEY
Tube Lore: Some Rediscovered RCA Special Tubes (Conclusion)
(In "The Vacuum Tube")

A telecommunications transmission engineer, Ludwell Sibley has had additional experience in moon-radar research, radio broadcasting, and commercial SSB point-to-point radio networks. He has edited a professional transmission textbook, edited/produced the *OTB* and *AWA Review* in years past, and written the electron-tube reference *Tube Lore*. Currently serving as temporary custodian of the Dowd-AWA-RCA tube archive, he holds the Tyne Award for tube documentation and is editor of the Tube Collectors Association's new *Tube Collector* publication. An alumnus of the 532nd Signal Company, he is known to the Federal Government as KB2EVN.

About Our **Contributing Editors**

RICHARD BREWSTER
Television

Dick has been hooked on electronics since grammar school. He has a degree in Electrical Engineering and has been worked on many interesting design projects during his career, including a direction finder for the Polaris submarine. After meeting his future wife, Susan, who had an interest in antiques, he decided to acquire an antique radio. But he didn't stop with just one! For the last 30 years, antique radios, and later TVs, have been somewhat of an obsession. Since his retirement from Westinghouse in 1995, the Brewsters have done quite a bit of travelling, most recently returning from Central Asia where they were active in compassionate missions. Next year, they hope to serve on the all-volunteer hospital ship, Anastasis, which provides medical services to African countries of the third world.

WILLIAM E. DENK, W3IGU
New Books and Literature

Bill received his first ham radio license, 9FPC, in 1928—just before the "W" prefix was added to U. S. calls. He holds both a Bachelor and Master of Science in Electrical Engineering (awarded 1932 and 1933). For awhile, his career progress was impeded by the Depression, but in 1937, he was hired by Philco Radio and Televi-

sion Corporation as a trainee in the patent department. When Ford Motor Company acquired Philco in 1961, Denk became a senior patent attorney in Ford's Office of the General Counsel, retiring in 1974. Following retirement, he served for three years as a patent consultant to a Philadelphia patent law firm, assisting in that firm's patent litigation. Bill began collecting old radios in 1966 and joined AWA in 1970. With wife Jane, he was Secretary/Treasurer of ARCA during the period 1976-1991. He is presently Chairman of AWA's Bruce Kelley-*OTB* Award Committee.

BROTHER PATRICK DOWD, F.S.C., W2GK
The Vacuum Tube

Brother Pat is a retired science teacher, a 20-year member of the AWA and the founder and curator of the Vacuum Tube Museum at Manhattan College (Bronx, NY). He has received both the Tyne and the Houck AWA awards for his contributions to vacuum tube history and preservation. Brother Pat is a Fellow of the Radio Club of America and a recipient of the club's Ralph Batcher Memorial Award. He has been an active radio ham for fifty years and is a longtime member and past president of the North Jersey DX Association.

WILLIAM B. FIZETTE, W2DGB
The Communication Receiver

Bill, who of course is our current AWA president, has been interested in radio almost as long as he can remember. He received his amateur license in college, after completing his military service at the end of World War II. Over the past 17 years, he has given generously of his time to the AWA—starting when Bruce Kelley asked him to do an *OTB* article on the National HRO communication receiver. This evolved into his regular communication receiver column. Bill has also served a one-year hitch as *OTB* Editor and is a co-founder (with Bob Morris) of the AWA Review. He has served on the AWA board, and as one of the AWA vice-presidents, for several terms. He holds BS, MS and Ph.D. degrees in pharmacy and microbiology. Now semi-retired, Bill attempts to work on his receivers in between the other demands so well known to all retirees.

CHARLES S. GRIFFEN, W1GYR
Recent Radio, TV and Entertainment Obituaries

Charles has been a radio builder and enthusiast since junior high school. He received his first amateur radio license, K2EWH, in 1953. Charles' dual background includes undergraduate degrees in electrical technology and a Master's in Library Science. He began his career as an electronics technician and served in the Air Force from 1952 to 1956. Later, he was employed at the Fondren Library at Rice University in Houston. In 1972 he came to Hartford, CT in 1972 to head the Hartford Public Library's Business, Science & Technology Department. Charles has been a volunteer at WJMJ-FM for the past ten years, and is currently the editor of the Quarter-Century Wireless Association Nutmeg Chapter's bulletin.

KEN OWENS
Equipment Restoration

Ken first became interested in electronics and radio as a high school student during World War II. By the end of hostilities, he and a friend were operating a thriving radio repair shop. Ken's career as a full-time radio tech ended when he entered college, eventually earning both a B.S. an M.S. in chemistry. Ken pioneered in the development of Mylar, working with manufacturers using the material in such applications as capacitors, videotapes and audiotapes. He became a serious radio collector in the 1980s, a few years after his retirement, and specializes in 1920s battery broadcast sets. Ken is active in the Central Ohio Antique Radio Association, and frequently gives presentations in radio theory and radio history.

RICHARD A. PARKS
Breadboarding

Dick was brought up in Springfield, MA, where his dad worked in the Westinghouse plant that had manufactured the RA-DA sets. The factory junkyards provided him with ample stocks of rejected chassis ripe for parts-picking. He served in the Navy from 1953 to 1957 and received his BSEE in 1961. Beginning in 1967, he made a career move that led him to become an expert in the identification of aircraft using computerized radar signal processing (an extension of the old military IFF techniques). In 1981 he became a consultant in this field, working mostly for the Navy and traveling worldwide for data collection and development testing. With the end of the cold war, Dick now finds himself semi-retired. In addition to his activities in electronics, he plays jazz in four or five bands, doubling on

(continued on page 66)

BUSINESS CARD ADS

Are you offering a product or service of interest to antique radio enthusiasts? Would you like to let the world know about the tubes, sets or paper you'd like to acquire? Place a business card in this space for the low price of $15.00 and it will seen by over 4,000 hard core devotees of our hobby. Purchase a year's worth of insertions (four issues) for $50.00 and save $10.00 over the individual ad pricing.

Send us a copy of your business card, or a special typeset ad designed to fit our standard space. We can, alternatively, typeset a short message for you (no more than eight lines, 50 characters max per line, please). For the time being, there will be no charge for typesetting. All ads must be for radio-related items or services and must be paid in advance. Send your ads and checks (payable to AWA) to Kevin Carey, Advertising Manager, *OTB*, P.O. Box 56, West Bloomfield, NY 14585. Closing date is six weeks prior to first day of month of issue.

CRYSTAL SET PROJECTS: 15 RADIO PROJECTS YOU CAN BUILD Xtal Set Society's design contest compilation featuring new projects: loops, multi-tuned, home-made capacitors, shortwave. 6x9 paperback, 160 pgs, $17.45. 800-927-1771 visa, PO Box 3026 St. Louis MO 63130. **www.midnightscience.com**

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OLD BROADCAST GEAR

Working or not, compressors, limiters, consoles, mics, EQ, Ampex, Western Electric Amps, Langevin, RCA, Collins, Altec, etc.

Mike States
Box 81485
Fairbanks, AK 99708
(907) 456-3419 Ph/Fax
mstates@polarnet.com

VINTAGE MICROPHONES BOUGHT OR TRADED

James U Steele
P. O. Box 820
Kingsland, GA 31548
(912) 729-1063 (Work)
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jsteele@k-bay106.com
http://www.k-bay106.com/mics.htm

PRE 1925 RADIOS WANTED
- Grebe CR series & R series amps
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- Manuals and advertising

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Tri-State Loudspeaker

"Re-Coning & Parts for all Speakers"
Vintage • Home • Auto • Pro
http://www.nauticom.net/www/speakers

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Radio Activity
Old radios repaired and purchased
Wanted Zenith consoles
Repairs guaranteed
Jim Berg (509) 732-4047
4261 Wilcox Rd. Box A Northport, WA 99157
jimfberg@webtv.net

ABOUT THE AUTHORS *continued from page 64*

trumpet, trombone, banjo and sometimes bass.

FLOYD A. PAUL, W6THU
The Loudspeaker

Floyd has been involved in radio since 1940, when he received amateur radio license W6THU. He graduated from USC in 1951 with a BSEE. After retiring from Cal Tech's Jet Propulsion Laboratory in 1978, he started collecting old radios and horn speakers. He authored a book on horn speakers that is still in print, and later, two books on the early years of radio manufacturing in Los Angeles. Floyd has served as Editor of the *OTB*'s *The Horn Speaker* column for twenty years. He is past president of the Southern California Antique Radio Society and editor of that club's bulletin.

JOHN F. ROLLINS, W1FPZ
Amateur Radio

Like so many of us, John Rollins has been interested in radio since boyhood. His hobby activities had to be put on the shelf during World War II, when he served in the South Pacific, and remained there during his college years and early career. John holds BSc and MSc and Ph.D. degrees in Petroleum Engineering, and spent 27 years as an exploration geologist for the Chevron Oil Co. His first ham licenses were foreign: 5R8AR (Madagascar, assigned 1971) and, later, CX9AW (Uruguay). John retired from Chevron in the early 1980s, joining a petroleum engineering firm involved in worldwide consulting. After total retirement from the oil business in 1984, he homebrewed (except for the receivers) a serious permanent ham station. Gradually, John's interests and ham activities have gravitated towards the restoration and/or replica building of transmitters in the 1924-1934 period, which he finds a never-ending source of challenge and enjoyment.

ROGER W. REINKE
Key and Telegraph

Roger tells us he is so old that he learned the basics of telegraphy when the Chicago & Northwestern Railway was still dispatching a few trains with it. Raising a family and pursuing gainful employment (among other things, he has worked with governmental bodies doing 911 emergency number development and radio spectrum management) distracted him until 1970 or so, when telegraphic interests were rekindled. He has been collecting instruments and telegraphic ephemera since then, especially pre-1900 items. Roger's strong interest in researching instrument design and manufacture led him to become the caretaker of the Key and Telegraph column after the late Lou Moreau stepped down. He retired from Federal service in 1993, but is still trying to improve his tennis game and the calls he makes as a goal judge for the National Hockey League.

CHUCK SCHWARK
On the Internet

Chuck is an electronics engineer with over 25 years of experience in video and audio systems design and fabrication. His experience has been in the industrial and broadcast video fields, and in areas such as computer assisted videotape editors and computer graphics systems. He started tinkering with radios in seventh grade, and electronics has been his hobby and profession ever since. Besides collecting and restoring antique radios for the past 8 years (with special emphasis on Philco), Chuck uses his boatanchor Hammarlund HQ-129X and console Zenith for shortwave DX-ing. He is currently Web Page Administrator for AWA, and a vice president of the Antique Radio Club of Illinois. He also serves as ARCI's Webmaster.

CLASSIFIED ADS

Old-time ads are free to members collecting and restoring equipment for personal use. Please observe the following: (1) one ad per issue per member; (2) include as SASE if acknowledgement is desired; (3) material must be more than 25 years old and related to electronic communications; (4) give your full name, address and zip code; (5) repeats require another notice (we are not organized to repeat automatically); (6) the AWA is not responsible for any transaction; (7) we retain the right to reduce an ad's size if over seven lines; (8) AWA does not accept commercial advertising in this column; and (9) closing date is six weeks prior to first day of month of issue. Ads received after that time will be held for the following issue. Mail all ads to: **RICHARD RANSLEY, P.O. BOX 41, SODUS, NY 14551**.

IMPORTANT!

OTB classified ads are now available for browsing in the "*OTB On Line Edition*" on our internet web site (www.antiquewireless.org). This practice will give members dramatically increased exposure for their ads.

SELL/TRADE—BC/SW TUBE RADIOS

Ambriola 6 tube battery 2 dial, inlay cabinet, see pg. 23 Bunnis 3rd edition, $225.; Zenith Model 33 6 tube AC set, 1928, $225.; Colonial first model made in Brooklyn before move to Buffalo, 6 good UX 199s, panel meter, beautiful light oak, $250.; Sparton Model 6-15. One of the first AC sets built in a battery cabinet during the change-over. Uses Sparton C-401 tubes. All sets play well and have good tubes. Pick-up or will deliver to AWA Rochester Conference. Ross Smith, 1133 Strong Ave., Elkhart, IN 46514 (219) 295-7770

1950's East German Stern radio, $50.; Former Czechoslovakian 1940s radio, $70.; British Murphy, $60.; All radios work. Argirios L. Adamidis, Kampouridi 19, Panorama, Thessaloniki, Greece 55236, Tel. (034) 342405 E-mail: aadam@it.teithe.gr

Emerson E301CG. This is a special model of the E301 featuring gold handle and speaker grill (rare). Excellent condition, no chips, cracks or scratches. Has back cover and is in very good working condition, $70. Plus shipping. Ralph Michelson, KG8FA. 4538 Golfview Dr., Brighton, MI 48116 E-mail: KG8FA@webtv.net

Crosley clock radio JC-6BN. Needs clock knobs and checking. $12.50 plus 6 lbs. UPS. John Uscinowski, 95 Vly Summit Road, Greenwich, NY 12834-9519

Zenith G500 Transoceanic; Conar Twins receiver and transmitter; 51J4 filters. Carter Elliott, 1460 Pinedale Road, Charlottesville, VA 22901 (804) 979-7383

All American Mohawk Lyric Junior, Model J cathedral radio by Wurlitzer; Federal 61, complete, very good condition, not rebuilt. Make offers via US mail. Buyer to pay shipping costs. No phone calls. J. Cadrecha, 292 South Prospect St., Burlington, VT 05401

SELL/TRADE—COMMUNICATIONS GEAR

National NC-44 receiver, excellent condition, $175.; National SW-3, clean, no coils, $275.; Measurements Corporation Model 59 grid dip meter with all coils, manual, excellent, $165.; antique parts for building radios and transmitters. Send list of needs SASE for prompt reply. S. T. Carter II, W4NHC, Fernwood Drive, Melbourne, FL 32904-1995 (407) 727-3015

SELL/TRADE—GENERAL

Carron Mfg. Co. Teenie Radio Crystal set, $175.; four pin short wave coils, $125.; Philco 118B cathedral , $295.; Zenith Pop-up, $40.; Acousticon Hearing Aid, boxed, $35.; Kadette Gothic Plaskon cabinet, $295.; Kadette Jr. for

parts, $150.; Federal curved top table radio, $75.; Jensen 15" speaker,$50.; Radiola VIII front panel with parts and knobs, $35.; Philmore mounted crystal detector in original package, $10. each; many Rider's indexes. Send SASE for large list. Bill Rolf, 30131 Center Ridge, Westlake, OH 44145 (440) 871-4547

Victor M.S. with wood horn, nice; Sears old big tube radio, nice wood, $90.; old Detrola Radio, $85. More old radios. Several variacs, circa 1927 tube tester, circa 1920 Voltmeter in nice leather case, $27.; Fisher 500 FM receiver, $100.; Dyna Stereo tube amplifier, $225.; Bell Amplifier w/6L6's, $75.; Fisher 500C; Harmon Kardons A500, F500, TA5000X; old radio horns; hundreds of Edison cylinder records including Uncle Josh, Preacher & Bear, Casey Jones and other comedies; Also Aeritino, United, Harmony, Standard and Uncle Josh disc records. Discovery of North Pole - Peary. Charles Seidel, Box 1500, Merlin, OR 97532 (541) 474-2596

Numerous radio consoles and combos by RCA, Philco, Majestic, GE, Airline, Amrad, Brandes, AK and others. Lists and details upon request. Offers considered. Malcom D. Burdick, W1NOO, 156 Station Rd., Hampton, CT 06247 (860) 455-9640 before 8:30 P.M.

Weltron 2001 space helmet radio, AM/FM, 8 track, nice, $100.; Grebe Syncrophase manual, (copy), 74 pages, contains history, specifications, illustrations, $15. plus postage.; Radiola III, $85.; Realtone Globepacer, 11 bands, $75. Ernie NAGY, P.O. Box 822, Elk Rapids, MI 49629-0822 (616) 264-9412 E-mail: elnagy1599@webtv

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Radio parts, books, tubes, tuning caps. Too numerous, at prices hard to believe. Also galena crystal radios, (homemade) and parts to make your own. Leonard Gardner, 458 Two Mile Creek Road, Tonawanda, NY 14150

Conn Organ Amplifier or Control NK-6051 - 5 sub-chassis on one long chassis. Has 28 12AU7 tubes (26 lbs.), $50.; Conn Power Supply and amplifier on one chassis (18 lbs.), $25.; 2 GE Tungar battery chargers (needs rewiring), operational, (13 lbs. each), $20. each; Hickok Type OS-7 Signal Generator (no leads or adapters). Uses 12A7 and 6F7 tubes (11 lbs.), $10; Transmitter tubes - 2 Westinghouse 813's, 2 JAN 3C24(VT204) in original boxes (2 lb. for each pair), $15. each or $50. for all.; Heathkit Color Bar Generator, Model IG62, (10 lbs.). All prices plus UPS or USPS transportation. Edwin Kubes, 11 Aster Dr., Debary, FL 32713-2807 (407) 668-5858

RCA Radiotron Designer's Handbook, Third Australian Edition, $50., NOS tubes: 2 - 211-VT4-C, $100. each; 3 - 866-A, $15. each; Raytheon 6080WB, $10.; RCA 830B, $100. J. S. Lowe, 3025 Harpers Ferry Rd., Sharpsburg, MD 21782 (301) 432-2420

QST file 1955 to 1995, good condition; SW-3 w/power supply, coils, extra tubes and manuals in excellent working condition. Best offer. Allen "Al" Breiner, W3TI, 212 Race Street, Tamaqua, PA 18252

Zenith Circle of Sound AM/FM table top radios K472W and H472W, $40. each. Also H472W clock, bit working, otherwise OK, $25. All plus UPS. Want arm actuator lift assembly for Collard Conquest record changer or junker for parts. Onerio Sabetto, 1717 Burgess Rd., Cleveland, OH 44112-1103 (216) 481-1036

Remler Infradyne Amplifier. A 1926 I.F. (3.5 MHz) amplifier used in the Sargent-Rayment Infradyne and other receivers. Photo in *ARC* March 1999, page 11, description in *ARC* May 1999, page 22. Also *Radio* August 1926 and *Old Timer's Bulletin* for March 1981, article by Rodney Schrock. Good condition, $60. Plus UPS. C. F. Crandell, 3412 Rugged Drive, Dallas, TX 75224 (214) 337-2823

SELL/TRADE—KEY & TELEGRAPH

About 15 bugs, 30 keys and a large assortment of sounders , relays, KOBs. Sounders, relays, and brass keys are $50. Each; KOBs are $75. SASE for list. Dave Pennes, WA3LKN, 4607-C Santa Cruz Drive, Indianapolis, IN 46268-5354 (317) 471-9605 E-mail: dpennes@hotmail.com

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G.M. Phelps camelback key, W.U. sounder; portable key & sounder, in oak case and more. Trade for unusual telephone or parts. Norman Mulvey, 310 Thorntree Lane, Canton, GA 30115 (770) 844-6277

SELL/TRADE—PARTS

Everything to build, repair, and retube receivers and transmitters 1925 through 1970. Tubes from 01A to 4 PR-1000A, air and mica capacitors, roller coils, switches, transformers and variable vacuum capacitors 5,000 volts up. Relay racks, cabinets, panels, chassis and aluminum boxes. Ready-built AC power supplies for portable equipment - 15 to 1000 watts. Francis Yonker,

W2IBH, 1229 Inverary Place, State College, PA 16801 (814) 867-1400

SELL/TRADE—LITERATURE

Sams Photofacts Auto Radio Series schematic books 1946 thru 1984: Vols. 1 thru 340 except missing Vols. 324, 326, 329 thru 333, 337 thru 340., $400 takes them all. 1015 Wurlitzer Jukebox manual (1946-48), professional reprint, $12. ppd.; Original Wurlitzer Jukebox amplifier schematics manual, models P-10 thru 1100 covered, $30. ppd. Jim Farago, 4017 42nd Ave., South Minneapolis, MN 55406-3528 (612) 722-0708

Numerous manuals for EICO, Knight, B&K, Harvey-Wells, B&W, Hallicrafters, Hammarlund, WRL/Globe, Zenith, National, Heathkit, Johnson, Gonset, RME, Multi-Elmac, Morrow, Drake, Ameco, Clegg, Pierson, Archer/Realistic, RCA, Collins, Swan, Superior, Millen, McMurdo Silver, Lafayette, Paco, Precision and others. Also catalogs for Allied, Lafayette, BA, Walter Ashe, EICO, Heath, WRL. A. J. Bernard, P.O. Box 690098, Orlando, FL 32869-0098 (407) 351-5536 E-mail: ni4q@juno.com

Radio schematics & service data, $2.50 plus #10 SASE (price is for 1 to 5 pages of data per Model, over 5 pages copy charge 20 cents per page). US & Canadian models 1920s to 1960s. Questions/quotes answered with SASE. Steve Rosenfeld, P.O. Box 387, Ocean Gate, NJ 08740 (372) 269-2022, fax (372) 269-2897 E-mail: srosenfeld@ems.att.com

Complete set of *QST*s from 1925 through 1998, and a complete set of *CQ*s from 1953 through 1998. Must pick up in the San Francisco Bay area. Highest bidder gets them. Robert Sarquis, 1053 Prune Ct., Sunnyvale, CA 94087-1826 (408) 739-6554 E-mail: bobsarquis@att.net

EIMAC tube catalog Dec. 1952, $20.; RCA Transmitting Tubes TT-5, $15.; Harris/Gates MW-50 Broadcast transmitter manual, $20.; Garrard RC88/4 instructions; *Radio Craft Magazine*, Nov. 1946, $12. Want UTC A, HA, LS series audio transformers, input types mostly. Also wanted, B'cast equipment by RCA, Langevin, WE, Collins, Fairchild, Altec, Gates, etc. Also want following tubes, 6386, EF804S. Richard Robinson, P.O. Box 1425, Wallingford, CT 06492 (203) 949-0871 E-mail: richmix@erols.com

SELL/TRADE—TEST GEAR

Meissner Analyst, VTVM, 1940s vintage, RF-IF amps, RF audio gen., 0-5 amp AC load measurements, complete (no test leads), need some repairs; Eico Model 145 multi-signal tracer, 1950s good condition; Triumph Model 830 oscillograph/wobbulator, 3" CRT, complete, inoperative, Navy Dept. Bureau of Ships Type CTU 600100, no test leads, no manuals for above, $75 plus shipping for all, will sell separately. (205) 491-2933 anytime. Jack Kaetz, 6841 Chesser Rd., Bessemer, AL 35023

SELL/TRADE—TRANSISTOR/ CRYSTAL SETS

Old Soviet transistor radios, $50.-$70.; Polish transistor, $40.; Chinese shirt pocket transistors, $30. (with original box, $40.); 2 transistor "boy's radio", $100.; Argirios L. Adamidis, Kampouridi 19, Panorama, Thessaloniki, Greece 552 36 E-mail: aadam@it.teithe.gr

SELL/TRADE—TUBES & TRANSISTORS

Large number of new and used xmtg tubes. 800 series, 1600 series, 2E series, T series, RK series, HY series. What do you need? All tested on URM-25 where possible. H. J. Mills, K4HU, 631 4th Avenue West, Hendersonville, NC 28739 (828) 693-7519 or E-mail: millsjr@bigfoot.com

Want to complete a number tube collection and need the following: Shamrock 28, 65, 66, 67; Sparton 70, 588 (88) rectifier; 91 Thyratron; Ken-Rad 90 & 95; Speed 291, 93 & 95 (295) and Globe 95. Have W.E. and others for trade. Send SASE for long list. Ross Smith, 1133 Strong Ave., Elkhart, IN 46514 (219) 295-7770

Collector's tubes - have many 3 digit tube types in original boxes. Send SASE for list or e-mail fathauer@home.com. I sell/trade or buy collector tubes of all types. George H. Fathauer, 688 W. First St., Ste. 4, Tempe, AZ 85281 Voice (480) 921-9961 fax 921-9957

2-216A W.E. w/sockets, 2-VT-1, one marked 203B-W.E.; 1-215A peanut tube; 1-CG1162 metal base, tip on top; 1-701A boxed (1942, 500W. diss.); 2-Duovac 2A PE movie tubes; 1-861 earliest screen grid transmitting tube. Frank Hutchins, 2034 Lake Josephine Drive, Sebring, FL 33872 (941) 655-0259

Ten 7 or 9 pin, or mixed radio tubes for $2.00. Your choice, if available. Leonard Gardner, 458 Two Mile Creek Road, Tonawanda, NY 14150

WANTED—COMMUNICATIONS GEAR

J.W. Miller Co. tuner Model 595; service manuals for RCA Direction Finder Model AR-8712

and RCA receiver Model 18T. Al Kaiser, W3LEQ, 713 Marlowe Road, Cherry Hill, NJ 08003-1551

Want National HRO050/60 in very good condition. Will pickup in September at the AWA Annual Conference. I will be staying at the Thruway Marriott. Carlos Vial, CE3FCF, P.O. Box 19051, Santiago, Chile

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*NC303 in excellent condition, fairly priced, no dealers. Will pickup if in the Syracuse, NY area. Gerald Liccione, W2TPL, 118 Hiawatha Trail, Liverpool, NY 13088 (315) 457-7928

WANTED—GENERAL

Magnecord Model #N35-B or Model 728 tape recorder. Also looking for Ampex Model AG-350 "Master-Electronics" and Presto Model K-11 disc recorder. Gaylord Ewing, P.O. Box 144, 19 E. Main St., Morris, NY 13808

Crystal sets, WD-11 tubes (dud); manual or schematic, knobs and push buttons (complete chassis in working condition, ok) for Zenith Transoceanic Model 8G005TZ1Y. Argirios L. Adamidis, Kampouridi 19, Panorama, Thessaloniki, Greece 55236 Tel. (031) 342405 E-mail: aadam@it.teithe.gr

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GE X-371, X-372; Hallicrafters CR-3000; Ten-Tec 315, RX-10; Mosley CM-1; Heathkit AR3; Zenith 8S661; American Bosch 440T; Philco 39-17. Herman Schnur, 3205 Brick Kiln Road, Greenville, NC 27858 (252) 752-2264

Home Brew Receiver using a "Reinartz" tuner circuit. I would like either a one tube set, or a 2 or 3 tube set with A.F. amplifier stages. Reasonable condition. Send price and condition. C. F. Crandell, 3412 Rugged Drive, Dallas, TX 75224 (214) 337-2823

Western Electric 25A or 25B amplifier (parts units wanted too), WE 540AW or 560AW speakers (damaged/missing cone OK), electron tubes: WE 217A, 216A, 205D/E/F, 101D, 104D, D86326, D86327, and Westinghouse WL-787. Transformers: input, interstage, or output trans. by UTC or TRIAD. Acrosound TO-350 output. Ming Yang, 1995 University Ave. #119, Berkeley, CA 94704 (925) 376-4220 E-mail yang1240@aol.com

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Zenith collector looking for four 1930s models: One of the following similar tombstones: Model 834, 835 or 935. These 10 tube sets have Deco-style, chrome-plated vertical bars, round white dial (approximately 5" diameter) and shadowgraph tuning; Model 715 tombstone (1934); either a 9S30 tombstone (1936) or 8S129 tombstone (1937) and; a 12A58 console (empty cabinet or complete). Thanks. Chris Hicks, RR2, Box 342, Clinton Corners, NY 12514 (914) 266-4257

Parts for Ampl-tone headset made by C. M. French Company. Need chassis for Arvin 417 tombstone. Patrick Franzis, 235 Millville Avenue, Naugatuck, CT 06770-3848 (203) 723-8976 before 9 PM E-mail: old_radios@yahoo.com

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Old headphones, one pair or entire collection. Also looking for unusual phone plugs and headphone literature. Please include asking price. Thank you. Bob Sukosky, 62 Strong St., Manchester, CT 06040 (860) 646-8857 5 to 9:30 PM Eastern

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GE X-371, X-372; Hallicrafters CR-3000; Ten-Tec 315, RX-10; Mosley CM-1; Heathkit AR3; Zenith 8S661; American Bosch 440T; Philco 39-17. Herman Schnur, 3205 Brick Kiln Road, Greenville, NC 27858 (252) 752-2264

Information on power supply for National AGS; Vibroplex Zephyr; Johnson GW matchbox. Brian Roberts, K9VKY, 130 Tara Dr., Fombell, PA 16123 (724) 758-2688

1930s Zeniths wanted to complete the restoration of a 12A58 console. Need an empty cabinet or I'd be interested in a complete set. I would also like to find a model 715 tombstone and one of the following tombstones: 9S30, 8S129 or 10S130. Chris Hicks, RR2, Box 342, Clinton Corners, NY 12514 (914) 266-4257

One, two and three tube sets and early superhets and other odd radios for my collection. Jim Berg, 4261 Wilcox Rd., Box A, Northport, WA 99157 (509) 732-4047 E-mail: jimfberg@webtv.net

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Wanted: Jenkins TV table for Jenkins mechanical TV. Also WWII TV camera equipment. Also early TV literature. Dick Brewster, E-mail address: anapost@mercyships.org(best). 145 Little Peconic Bay Rd, Cutchogue, NY, 11935 (will be forwarded).

WANTED—INFORMATION

Schematic and operator's instructions (photocopy OK) for a Sprague Tel-Ohmike Model TO-5 ca-

pacitor analyzer. Schematic and operator's instructions (photocopy ok) for B&K Model 1076 television analyst. Also does anyone have any information on a Southwestern Instrument Corp. test instrument Model RA2, S/N: S-400. Tests old 4, 5, 6 and 7 pin tubes, ohms, AC and DC volts and DC milliamps. Test results displayed on two meters. Device is housed in a hardwood case. Allie Lingo, P.O. Box 118, Dierks, AR 71833

WANTED—KEY & TELEGRAPH

I have over 200 different bugs (speed keys) in my collection. If anyone has one I don't have I will make it worth your while to acquire it. Rare and unusual types most welcome. I have traders. Gil Schlehman, K9WDY, 335 Indianapolis, Downers Grove, IL 60515 (630) 968-2320

Bottom of the line Vibroplex Zephyr. Looks like Champion except for 3" wide base, McElroy bug. Brian Roberts, 130 Tara Dr., Fombell, PA 16123 (724) 758-2688

WANTED—LITERATURE

Circuit diagram and alignment data for any HRO using 6J7, 6J5, 6SQ7, 6K7 and 6U6 output tubes. Let me know cost and I will remit. Frank Kiss, Box 3361, Spruce Grove, Alberta, Canada T7X 3A7

WANTED—MILITARY

Looking for WWII Japanese military radios and related items; U.S. RT-77(*)/GRC-9 with front cover CW-109/GRC-9 in excellent or very good condition. Tadayuki Yamada, 5-2-36 Tamadaira, Hino, Tokyo 191 Japan E-mail yanada@jrce.co.jp

Want to purchase WWII and Korean War Walkie Talkies, parts and related literature. Please write to me with a description of what you have. Thanks! Bill Jewell, 3800 Ridgehaven Road, Fort Worth, TX 76116 (817) 377-4664 or E-mail: old radios@aol.com

WANTED—PARTS

Loop antenna for Priess Straight "9" Nine, or specifications for building one. Dale Johnston, 1305 Guadelupe Dr., Westminster, MD 21157 (410) 848-5279

Want the following for parts sets - Philco Model 70 and Philco Model 20A. James Maloney, 1703 Leno Road, Macedon, NY 14502

Glass dial to a RCA Catalin 66X7, 66X8, 66X9. Your postage returned. Gregory Sheppard, W3FSP, 4402 Jupiter St., Rockville, MD 20853 E-mail: moreradios@webtv.net

WANTED—TEST GEAR

Accessories for Boonton Radio or HP 250A RX Meter; Coax Adapter Kit 00515A for Boonton Radio or HP 260A Q-Meter; Q-Standard 518-A5; General Radio 1690-A Dielectric Sample Holder. Hans Jucker, Zielackerstr. 7, CH-8603 Schwerzenbach, Switzerland, Phone/fax 41 1 825 32 11 E-mail: hhjucker@swissonline.ch

WANTED—TUBE RADIOS

Zenith wood table radios from 1930 to 1940. Philco 90 cathedral, any condition. Hopeless basket cases ok. James Fisher, 344 Harrison Ave., Manville, NJ 08835 (908) 725-7476 E-mail: y-r-less@juno.com

VACUUM TUBE, *continued from page 61*

6EM7. Technical details unknown. Intro. 1962. Sold only to Warwick Mfg. Co. and Sears (via private-brand process). Tubes were apparently etched "6EM7" and branded "2071."

2076 [AKA 2076/5R4GYB]; full-wave rectifier, 5R4GYB with cage rotated with respect to base pins but same pinout {R60060B}. Sales limited to Motorola C&E Division, and distributor market. Introduced 1965. Changed in 1975 to 2076/5R4GB, with plain bakelite base.

2077 [AKA 2077/7587]; Nuvistor tetrode, selected 7587. Sold only to Narco Co, presumably for use in VHF aircraft transceivers. Withdrawn 1965.

2078-80 Nuvistors, selected from regular types w/ 120-hour aging, introduced 1966. Sold only to Fairchild Du Mont, presumably for use in oscilloscopes.

2078 Triode, 7586.

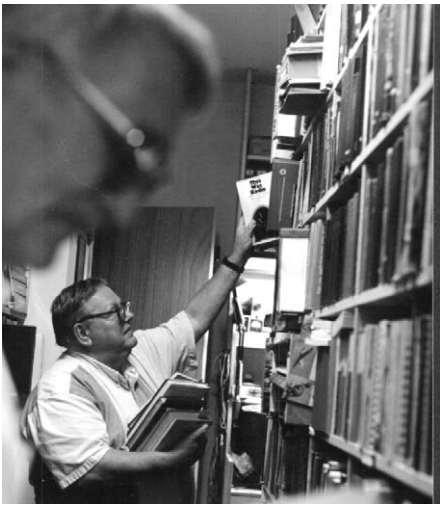
2079 Tetrode, 7587.

2080 Triode, 8056.

2081-82 Min. 9-pin computer-rated types, sold only to Electronic Associates, Inc., and distributor market. Introduced 1968.

2081 Triode-pentode, specially constructed 6AW8A ("6AW8A Code 24") Tubes were etched "6AW8A" and branded "2081/6AW8A."

2082 Duotriode, selected 12AY7. Tubes were branded "2082/12AY7."



Clockwise: 1. *Curator Gable gets the news about K2SZE's KWM-2 donation. 2. Thanks to the rehabbed dehumidifiers, the museum's precious paper collection is well-protected from mold and mildew. 3. The database committee kicks some ideas around at their weekly meeting.*

On the front burner is the database committee, chaired by Paul Norder, KG2EP, which has approved the use of Past-Perfect, a software package specific to museum collections management.

Personally I'd like to thank all of you for the nice cards and letters on two subjects. The first was my selection, last month, as ARRL Radio Amateur of the Year for the Atlantic Division. The award cited the need to look into the past as we move into the future and the year 2000, and further cited work done by me and the AWA. As such, the award is shared with all of you.

Second, I recently tested the laws of gravity by falling off a ladder. Thirty-two feet/sec/sec is still valid! Nothing broken, but several parts sure were not in the right place. Again, thank you for your kind words, and all is mending well.

Be sure to schedule time to see your museum at the Fall Conference. Schedule information is elsewhere in this issue. Also look at the new AWA Web site (www.antiquewireless.org) and view a couple of pages devoted to the museum. I think you will like the "A Day at the AWA Annex." *(See preview on page 32 of this issue! —Ed.)* When you see those hard working Annex guys at the conference, be sure to say hi and thanks!

Cheers,
Ed Gable K2MP/W2AN
Museum Curator/Director

RECENT MUSEUM DONORS

Sheldon Kane KA2HSU / *Splitdorf console radio*

Joseph Dreher W2TKG / *Test equipment, books*

Art DeBruycker W2YGW / *Meters, tubes*

Goyne Reinhardt W2AF / *SX-73, Collins S-Line, NC-303, VHF Beacon TX & much more*

Mrs. John W. Roblin / *Zenith console and T.O.*

Ms. Rhoda Briggs / *Developmental tubes*

Richard Kessler K2SZE / *Collins KWM-2, Dovetron terminal*

Millard Hoagland W2SHN / *Kenwood TS530S, SB-200, Ameritron amplifier, more*

Stewart Merson / *Heath CA-1 Conelrad monitor*

Howard Farnsworth / *Several table radios & Bendix console*

Douglas LaVere / *Philco Predicta, Motel type with audio*

John Schooley K2NC / *Hallicrafters SX-96A*

Allan Pellnat KX2H / *20s style in-circuit tube tester*

Mark Block / *GE F-24 BC/SW*

Rosemary A. Scotney / *Brandes B-15 console, Victor VV260*

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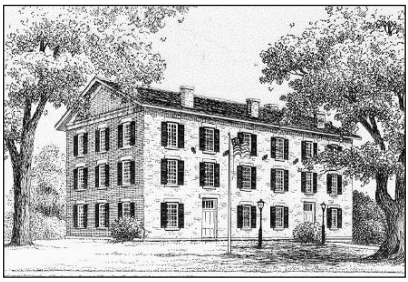

Mailing Address:
Ed Gable, Curator, AWA Museum,
187 Lighthouse Rd., Hilton, NY 14468
e-mail: k2mp@eznet.net

MUSEUM NEWS

Busy is an understatement for your museum volunteers. Sweaters have been replaced by shorts, and a wide variety of knobby knees are in full view as we abruptly changed seasons. The HVAC system in the new storage facility is working really well and all previous signs of mold and soggy paper have been fixed. Mani and the facilities crew completely tore down the dehumidifiers, right down to motor bearings, and for the first time in years those are humming (as opposed to screaming) away and doing a creditable job in the remaining portions of the building.

I'm very pleased with the continuing level of donations. We have been fortunate in being the subject of many very nice feature articles in local newspapers, resulting in donations from the general public as well as those from our generous members. It is heartwarming to know that not all nice artifacts go to e-bay! The K2SZE donated KWM-2 (CCA9+) has a nice history in that it used to belong to the V.P. of Research at Kodak, K2DQ, and was completely restored prior to delivery to the museum.

The May meet was fun, although attendance was down a bit. We will spice up activities for next year and I would be delighted to hear your comments and suggestions.

The Spring meeting of your museum Board of Directors was widely attended and great progress was made in solidifying the museum's future. First, the Board approved the much needed AWA Museum Policy Manual. For the first time we have approved and defined our purpose, the definition of the collection, and operating policies and procedures for the day-to-day running of the museum. We needed this not only to give us operating direction but also as a requirement to obtain a permanent New York State Charter. That almost year-long process is on-going and we're awaiting an on-site visit from the State.

Previously on these pages we lightly chatted about building a new museum on the property we own adjacent to the current Annex. That activity is on the back burner until our Charter is fully in place and more resources can be focused in that direction.

(continued on page 72